1957 should, therefore, be regarded as an exceptionally bad year. If the average yield per acre over the 3 years prevailed on the acreage cultivated in 1957, the production would have been 338,000 cwt., in contrast to the 281,598 actually harvested. The former figure of 338,000 cwt. has been used as representing the potential yield from the area cultivated in 1957.

Local production was supplemented by the import of 284,000 cwt. costing Rs. 31 million. Altogether about 565,000 cwt. of chillies were used for consumption in 1957. By 1968 our requirements would have increased to around 781,000 cwt. on the assumption that per capita consumption is at the same level as today. In the case of chillies as well as onions such an assumption is likely to be valid as consumption of these commodities does not vary widely at different income levels. The increase in total requirements would therefore depend solely on the increase in population. If imports of chillies are to be unnecessary by 1968, local production should by that time have expanded by a further 443,000 cwt. above our present potential local production. Since the present average yield per acre of 11.1 cwt. is quite satisfactory, this implies that an additional 40,000 acres should be harvested.

Chillies are grown both during the Maha and Yala seasons though not on the same land. In general, yields are higher in Maha than in Yala, and under irrigation as opposed to rainfed cultivation. An added advantage is that its cultivation is not confined to some districts but is spread throughout the country. Cultivators have not displayed any reluctance to grow this crop so that the supposed conservatism of peasants will not impede this programme. Neither will the lack of land hinder the implementation of this programme as developed fallow land is often used for its cultivation.

The committed scheme of the Ministry of Agriculture visualises an expansion in the cultivated acreage until by 1961, 56,000 acres altogether would be under chillies. The programme will not terminate there but will be continued until the additional 14,000 acres required for self-sufficiency is also brought into production.

Self-sufficiency in red onions is even easier to attain than in chillies. Our imports in 1957 amounted to only 2,000 cwt. valued at Rs. 15,000. Local production that year has been estimated at 982,000 cwt. The total consumption of onions was thus 984,000 cwt. On the same assumptions as made earlier, this would have risen to 1,358,000 cwt. by 1968. The local production of 982,000 cwt. is obtained from an area of roughly 17,426 acres. The average yield per acre thus works out to 56 cwt. At this yield the additional area which ought to be harvested for self-sufficiency is only 6,400 acres.

It is clear that a target of 6,400 extra harvested acres is not difficult to reach. It is simplified further because some of the land can and is even at present double-cropped. Accordingly the extra land acreage required is not likely to exceed 4,500 acres. The cultivation of onions is undertaken largely in the Northern Province. At the same time it is becoming increasingly popular in the Central and North-Western Provinces.

Another factor which would contribute materially to the success of both these programmes is the price local producers receive for their crop. Both chillies and onions are within the Guaranteed Price Scheme and the price fixed under this Scheme is Rs. 24.64 per cwt. of Red Onions and Rs. 134.40 per cwt. of chillies. The comparative import prices are Rs. 7.50 per cwt. of onions and Rs. 108 per cwt. of chillies. The balance is very clearly weighted heavily in favour of the local producer. Cultivators of both these crops cannot fail to find its cultivation profitable, especially if disposed of under the Guaranteed Price Scheme.

COFFEE

It is ironical that this country which at one time was an exporter of Coffee has now to import virtually all its requirements. Coffee is no longer grown here on a commercial scale. The acreage at present under coffee in the Island is not more than 200 acres. Hence the country depends for its requirements almost entirely on imports which in 1957 amounted to 1.5 million lb. valued at Rs. 2.1 million.

It is estimated that the requirements of Coffee in 1968 at constant consumption level would be in the region of 1,854,000 lb. At the adjusted rate of consumption the demand for Coffee is expected to rise to 1,926,000 lb. The objective is to produce this amount by 1968. At the rate of 4 cwt. of Coffee per acre the acreage required is slightly above 4,000 acres.

A scheme has already been formulated by the Department of Agriculture to popularise the cultivation of coffee. Their immediate scheme is to bring about 2,000 acres into cultivation. In addition to this coffee will also be cultivated on some of the Highland Colonization Schemes of the Ministry of Lands and Land Development. Under this scheme allottees will be given 2 acres each and each scheme will contain 50 allotments. Altogether it is planned to cultivate around 3,000 acres under this Scheme. The investment outlays on this project are included within the provision made for Highland Colonization Schemes as a whole.

OTHER CROPS

In addition to the schemes discussed earlier, the Department of Agriculture has formulated a number of schemes for the cultivation of other commodities. Among them one of the more important is a scheme for growing cotton. Cotton unlike the others so far analysed is not a food crop but is the basic raw material for cotton textiles on whose import over Rs. 100 million was spent in 1957. In physical terms almost a 100 million yards of cotton textiles, representing approximately 28 million lb. of cotton, were imported that year. Locally produced cotton goods constitute as yet only a small part of the total supply while cotton goods produced from locally grown cotton form an even smaller proportion of our annual requirements. While it is not feasible to attempt to grow here our full requirements of cotton, nevertheless it would be economically profitable to grow cotton on a limited scale in those areas which are climatically ideal for cotton, and where cotton would be the most suitable crop. It has been found that in certain sections of the Dry Zone medium and fine staple cotton can be grown with striking success. Even at present cotton is grown in these areas as a chena crop. The major reason for the small acreage is the fairly rigorous conditions that must be fulfilled if this crop is to be cultivated successfully. " The crop can mature with 24 inches of rain but can tolerate 30 inches if the distribution is satisfactory. The area selected for cotton should preferably have no pronounced South-West Monsoon as the early yala rains would spoil tail-end cotton. Apart from rainfall, temperature has important effects on reproduction in cotton ; a critical minimum temperature is necessary for flower initiation ".

The Department of Agriculture has initiated a cotton growing project in the area between the Walawe Ganga and the Kirindi Oya. An additional advantage of this site apart from its suitability in respect of soil and climate is that the land on the left bank of the Walawe Ganga adjacent to the Ridiyagama Cattle Farm has an assured water supply throughout the dry season for domestic purposes and livestock. The scheme when complete will consist of 2,400 acres of arable land of which 1,200 acres will carry cotton each year in a two course rotation. Permanent pasture is to be established on 4,800 acres, and the whole project will comprise 8,000 acres. The Department of Agriculture has estimated the total cost of this project at Rs. 14.9 million of which over Rs. 8.5 million will represent the cost of machinery and equipment. When complete this project will produce around 6,000 cwt. of cotton.

In addition to the Department Scheme, cotton will continue to be grown as a chena crop in parts of the Dry Zone. Its cultivation has been expanding gradually and it is believed that the production in 1959 will be the highest so far. While the trend of an expanding output of cotton can be expected to continue, it is virtually impossible to make any firm estimates of production through chena cultivation in 1968. There is no doubt however that it will be nowhere near our requirements of cotton if our requirements of cotton textiles are to be produced from locally grown cotton. Since raw cotton can be imported easily and cheaply, this will in no way hinder our programme for manufacturing our textiles.

The programme outlined earlier has largely been confined to those commodities on whose import a considerable amount of foreign exchange is spent. They would continue to deplete our foreign exchange earnings unless efforts are made to grow them locally in increasing quantities. It has therefore neglected those products which are either not imported or those which do not cost much in foreign exchange. The fact that they have not been discussed in detail does not signify that attempts to commence or expand the production of such commodities will cease. On the contrary, production of these too will need to expand if the import bill is to be kept as low as possible. For example, a fair amount of money is spent at present on the import of various pulses. Some of these such as dhal, green gram and chick peas can be grown here. These are usually grown as chena crops on highland in the Dry Zone. With the increasing development of the Dry Zone, the output of these subsidiary crops too will rise. Similar considerations would hold for articles like vegetables and fruits. If there is to be no shortage of locally grown vegetables by 1968, measures for expanding output and its orderly marketing must be put into effect straightaway. The fact that such commodities have not been given prominence in the earlier discussion has largely been the result of setting import substitution as a major objective of the plans in this sector. Accordingly programmes and schemes for all the other numerous agricultural products which are collectively so important in our food requirements must be formulated and implemented simultaneously with the projects already discussed.

INVESTMENT ON THE DEVELOPMENT OF CROPS AND ANIMAL HUSBANDRY

Very tentative estimates of the costs that would be incurred in implementing this part of the agricultural programme have been worked out and are presented below. In many instances fairly arbitrary figures have had to be assigned as no reliable data on actual costs are available. These estimates should therefore be regarded as indicating the order of magnitude of the investment required and likely to be undertaken rather than firm projections of costs. As the implementation of the programme gets under way it will be possible to refine and modify these figures.

TABLE XIX

Investment in Specific Crops and Animal Husbandry (1959–68)

(Rs. Million)

	1959	*1960*	*1961*	*1962*	*1963*	*1964*	*1965*	*1966*	*1967*	*1968*	*Total*
Investment for the expansion of paddy production including minor irrigation works	8·2	10·0	12·0	13·0	14·0	17·0	19·0	21·0	23·0	25·0	162·2
Investment on the establishment of pasture and other projects for the development of animal husbandry	2·0	3·0	5·0	7·0	9·0	11·0	13·0	16·0	20·0	23·0	109·0
Capital investment by Milk Board	1·0	1·0	2·0	2·0	3·0	3·0	4·0	4·0	5·0	6·0	31·0
Investment in storage and marketing facilities	4·0	5·5	6·0	6·0	6·5	7·0	8·0	9·0	10·0	12·0	74·0
Investment in agricultural machinery and implements	15·0	16·0	17·0	18·0	19·5	21·0	22·5	24·0	25·5	27·5	206·0
Investment for the development of crops	14·0	15·4	16·0	16·5	19·0	20·8	22·6	24·0	25·0	27·0	200·3
Total	44·2	50·9	58·0	62·5	71·0	79·8	89·1	98·0	108·5	120·5	782·5

The estimates cover all investment in agriculture other than on the 3 major export crops, irrigation, land development and colonization.

The investment which will be made in this section of agriculture has been estimated at Rs. 44 million in 1959. As the programme gathers momentum the investment will increase progressively until by 1968 it will amount to Rs. 120.5 million. Over the entire ten year period the total investment outlay has been estimated at Rs. 782.5 million.

It will be observed that separate provision has been made here for investment in storage and marketing facilities as well as for the purchase of agricultural machinery and implements. Investment in these categories becomes necessary when a development programme of this scale is undertaken. A rising volume of agricultural products necessitates the expansion of storage and marketing facilities at all points between producer and consumer. Provision has been made in the sum of Rs. 74 million over the ten year period for this item. Similarly, considerable investment on agricultural machinery and implements will need to be undertaken if the programme is to be implemented successfully. Already the use of tractors in paddy cultivation is spreading, especially on clayey lands in the N. C. P. and elsewhere in the Dry Zone. The adoption of improved techniques by cultivators will also lead to investment in row seeders, weeders, ploughs and other such implements. A sum of Rs. 206 million has been provided to cover the investment costs of such agricultural implements.

A major part of the investment on the development of specific crops and animal husbandry will be undertaken by the private sector. At the same time a part of this investment will be undertaken by the public sector. Thus almost the whole of the investment on the expansion of paddy production, which includes the construction of minor irrigation works, the whole of the investment by the Milk Board and some part of the investment in storage and marketing facilities will be borne by the Government. Private investment outlays, on the other hand, will be devoted largely to the development of the various crops and animal husbandry. Even here there are some Government projects such as the Cotton Project and the Pasture Development Project in the Dry Zone. But the Government share of the Rs. 310 million provided for the development of crops and animal husbandry will not be large.

The investment table given immediately above excludes the capital costs of the irrigation and land development programme which were considered earlier. If these investments are added to that incurred on the development of crops and animal husbandry, the total investment in agriculture excluding the three major export crops will be :

TABLE XX

Total Investment in Non-Plantation Agriculture (1959-68)

(Rs. million)

	1957	*1959*	*1960*	*1961*	*1962*	*1963*	*1964*	*1965*	*1966*	*1967*	*1968*	*Total*
Investment in agriculture other than the three major export crops	90	95	109	136	151	171	193	213	240	263	301	1,875

The estimated investment in 1957 is also shown for the sake of comparison. In 1959 this would have increased to Rs. 95 million. In 1968 it is estimated that the total investment will be just over Rs. 300 million while over the entire decade Rs. 1,875 million will be invested in the non-export agricultural sector.

CHAPTER 7

PLAN FOR THE DEVELOPMENT OF THE FISHERIES INDUSTRY

Introduction

FISHERIES constitute one of the potential fields of expansion in the economy. A sizeable volume of the country's foreign exchange resources is now spent on imports of fish products. The replacement of these imports, in terms of the requirements of not only the present population but also the future population, must therefore form an important part of development policy. Accordingly the programme for fisheries enjoys a position of high priority in the overall plan.

The programme presented here has been prepared jointly by the Department of Fisheries and the Planning Secretariat. An earlier report submitted in August, 1958, by a team of experts from Japan was available as a basis. The present programme incorporates certain revisions and modifications to the Japanese report and also includes additional estimates covering important aspects of the fishing industry.

The preparation of a plan for development on the scale proposed now was made possible by the experience gained in the Department from the work on projects under the Colombo Plan, chiefly through Canada and Japan and under the F. A. O.

AIMS OF THE PLAN

The production in 1957 of fish in the island was a total of 761,301 cwts. of which 28,956 cwts. were produced by the two departmental trawlers. In the same year, the quantity of fish imported into the island (in wet fish equivalent) was 2,130,420 cwts., making a total quantity of fish available for consumption of 2,891,721 cwt. The population in mid year 1957 was estimated at 9,165,000 giving consumption per head of population as 0.32 cwt. (36 lb.). For comparison, the figures of consumption of fish in a few other countries (Morgan: 1957, *World Sea Fisheries*) is given below:—

Very low	*Low*	*Moderate*	*High*
(below 5 kg.)	(5-10 kg.)	(10-20 kg.)	(over 20 kg.)
India	China	Philippines	Japan
Pakistan	Indonesia	Siam	Malaya
Turkey		Indo-China	
		Ceylon	

1 kg.=2·2 pounds.

The Consumer Finance Survey conducted by the Central Bank in 1953 reports the figure of 17.62 lb. as the average consumption of fish per head in that year. If the quantity of fish produced locally is added to the quantity of fish and fish products imported, irrespective of its form i.e., unconverted into wet fish equivalent, to obtain the quantity of fish available for consumption, a figure of 16.9 lb. is obtained as the consumption per head of population in 1957.

Accepting for the purpose of this plan that the rate of consumption per head (36 lb. wet fish) will not change and presuming a population of 12,289,000 in 1968 it is estimated that 3,932,000 cwt. of fish are required to make the island self-sufficient in fish. This population estimate is lower than that used elsewhere in this document as at the time that the plan for fisheries was drawn up the later estimates were not available. It has therefore been assumed that the difference between the target output presented here and the estimate of the likely level of demand for fish products in 1968 will be imported. There is every likelihood, however, that the target output presented here will be exceeded and that imports will be virtually eliminated.

The plan which follows aims at achieving this production in 1968. Table I summarises the position described above.

SUMMARY OF PROPOSALS

In short summary the following are the proposals being made to achieve the production of nearly 4 million cwt. of fish in 1968 :—

(*a*) Mechanization of existing craft, viz. Orus, Vallams and Kattumarams.

(*b*) Introduction of new and improved methods of fishing to existing craft such as Teppams.

(*c*) Introduction of new mechanized boats necessitating the construction of fishing harbours and setting up of boat-building yards.

(*d*) Introduction of new trawlers to Pedro Bank and additional trawlers on Wadge Bank.

(*e*) Introduction of pelagic tuna boats.

(*f*) Setting up of facilities necessary for the efficient operation of the large boats.

(*g*) Provision of adequate freezing, ice and cold storage plants.

(*h*) Improvement of marketing and transport facilities.

(*i*) Development of fresh and brackish water fisheries.

(*j*) Provision of adequate credit facilities, and

(*k*) Improvement of technological and biological research on fisheries problems.

FISHERIES STATISTICS

It would be appropriate right at the outset to stress the importance of having accurate statistics, both from the point of view of planning and of evaluating progress. The inquiries made for the preparation of this report revealed how little statistical information is available regarding the fisheries of the Island and it was found that what was available was itself not always reliable nor complete enough to enable definite decisions to be taken. These limitations are reflected in the report and the statistical section of the Department should be strengthened so that these shortcomings can be remedied and the programme of development revised annually with a view to making it more accurate. One point must be mentioned here and that is the question of permanency in the Department of the Statistical Officer who obtained special training in Fisheries Statistics. The Officer at present in the Department was sent out a few years ago for a short specialized training abroad in Fisheries Statistics. Shortly after his return he was transferred to another department and replaced by another officer who had to start at the beginning learning the methods and sources of Fisheries Statistics in this country. About 2 years ago the Department was able to obtain back the services of the original officer, who is due to go again for a further course of training in Fisheries Statistics. It would be a pity if he is again moved out of the Department and there should be some understanding that this is not going to happen. This officer should be retained and sufficient staff appointed to ensure that the collection and analysis of statistical information is properly carried out. The department has been able to obtain, through F. A. O., the advice of a Fisheries Statistician, and proposals for organising the statistics branch of the department are being prepared.

MARINE RESOURCES

The speedy development of this industry merits the highest priority in any investment plan for this country. In the first place fisheries development would result in a considerable saving of foreign exchange as otherwise imports, especially of dried fish, would be required to supplement local production and thereby make up the balance of consumption. From this angle this industry should be placed on a par with expansion in the export industries. Secondly the development of fishing stimulates the growth of many subsidiary industries, all of which generate further employment. Thus, expansion on the pattern suggested in this document would lead to the growth of the boat building and repair industries as well as cold storage, transport, distribution and marketing. Moreover the gestation period of investment in fishing is relatively brief, inasmuch as the fish will be caught almost simultaneously with the introduction of the craft. Thus a rapid increase in output which in itself is essential to the further growth of the economy is assured. Finally, expansion in fish output is not contingent on heavy investment being incurred on bringing the resource—in this instance the ocean—into a position where it can be exploited. This is in sharp contrast with agricultural development, especially in the dry zone. In that sector considerable sums of money have to be spent on irrigation, &c., before the land can be exploited to yield a flow of output. In fishing on the other hand such investment costs are absent; what is needed being capital for craft and working capital.

The sole limiting factor, therefore, to fisheries development is the productivity of the ocean and it is necessary to examine what assumptions regarding this productivity have been made in preparing this plan. In the first instance it will be necessary to classify the target production of nearly 4 million cwt. by the different areas of the ocean that are to be exploited. This classification is as follows.—

(*a*) Existing Craft	531,639 cwt.
(*b*) Beach Seines	228,492 ,,
(*c*) New Mechanized Boats	2,744,750 ,,
(*d*) Wadge Bank	156,600 ,,
(*e*) Pedro Bank	109,620 ,,
(*f*) Large Tuna Boats	162,856 ,,
TOTAL	3,933,957 ,,

The existing craft and the beach seines are expected to account for 531,639 cwt. and 228,492 cwt respectively, making a total of 760,131 cwt. as against a catch of 732,345 cwt. derived by the same craft and methods in 1957. The detailed allocation of this catch is shown in Table VIII. It would be appropriate at this stage to point out that a decline of the beach seine fishery at about 2 per cent per annum has been assumed as there already is a trend in this direction which is likely to continue in view of the other more remunerative methods of fishing that will be available.

It would be reasonable to state that, on the average, the off-shore fisheries of the Island do not extend to beyond 20 miles and accepting a coast line of 1,000 miles, the figure of 750 cwt. (85,000 lb.) is obtained as the average landings per mile of coast line in 1957—a figure which must be examined bearing in mind the comparatively large extent of coast line on the east and south-east that is not operated from at the moment. If any allowance is made for this fact, a higher average would result. For comparison, the landings per mile of coast line on the south-west coast of India are said to be over 1 million pounds while the average for the entire Indian coast line is about 300,000 pounds per year.

With the introduction of new mechanized boats, the smaller fishermen will be able to fish up to about 50 miles from the coast. The skipper of the "Braconglen" has in fact reported that he nearly ran down one of the new small mechanized boats 40 miles off the coast. These new mechanized boats, the beach seines and the existing craft would be depending on an area of approximately 45,000 sq. miles of ocean and they together are expected to produce 3,504,881 cwt. of fish or 77 cwt. (8,625 lb.) per sq. mile. The only figures that could be obtained for purposes of comparison were two figures of actual landings in 1957, one for the North Sea of roughly 20,000 lb. per sq. mile and another for the Baltic of 5,000 lb. There has been considerable discussion as to whether the figure of production estimated in this report is excessive or not and, in the absence of definite evidence that the plan will cause over fishing of the off-shore fisheries and considering that the small boats will depend to a great extent on pelagic stock, it was decided to retain the figures now appearing. It should also be pointed out that the target now aimed at is less than that set by the Japanese team of experts, who presumably did examine this aspect.

As regards Wadge and Pedro Banks, there is in fact very little information available about these two grounds and it will be essential that the operation of an increasing number of trawlers on them be critically watched right from the beginning and a revision of the plan made if there is any evidence of overfishing. The plan is however, based on roughly the same extraction of fish as was proposed by the Japanese team.

The pelagic Tuna boats have more or less unlimited resources for exploitation and their operation will raise no problems of overfishing at the present moment.

Details of the Plan

METHODS OF INCREASING CATCH FROM EXISTING CRAFT

Table II sets out the number of each of the principal types of craft in use and attempts to apportion the local production among these craft. It will be possible to increase the catch of all the principal varieties of craft used in the Island either by mechanization or by replacing the present gear used with more modern gear. The scheme for these improvements are set out below according to each type of craft.

ORUS

According to the figures of registration available there were 6,306 orus in operation in 1957. As all these boats do not operate daily it has been assumed that only 60 per cent are in actual operation and the figures of production for this type of craft have been based on 3,784 craft producing an average of (54 cwt.) 6,000 lb. a year. The annual catch from this craft is estimated at 202,714 cwt.

The only form of improvement which the Department of Fisheries is at present able to recommend for the oru is mechanization with outboard engines. This has been done successfully at a number of places on the west coast and its practice is rapidly gaining popularity. With mechanization fishermen are able to use more efficient forms of gear, particularly long lines, which should result in catches being doubled at least. This scheme provides for the mechanization of 1,000 boats within the 10-year period. It was considered that more than this number of boats could not be mechanized as owners would be likely to prefer to invest in the newer types of boat. For the same reason it was considered that an oru will not be replaced by a new oru when it went out of use but would be replaced by a more modern craft. Mechanization of orus would, however be resorted to by those persons whose craft were new enough to discourage these from disposing of them. In addition the oru still remains the only boat which can certainly be used on the beaches in the west and south-west costs of the Island without harbours, and those fishermen who do not wish to migrate from their homes during the off season may still prefer to retain their orus and operate from their home beaches. With the construction of harbours however, the orus are bound to lose favour and no doubt will disappear sooner or later.

The estimated cost of mechanizing an oru is on the average, Rs. 1,500. The life of an outboar engine, however, has been found to be very variable when used by local fishermen, the period varying from 6 months to 2 years. The new gear which can be used from a mechanized oru has been estimated to cost of Rs. 1,500.

The programme will need to be completely financed by loans from Government and considering the uncertain life of the engines in the hands of the fishermen it was considered necessary to lay down a period of 1 year within which the loan should be recovered.

A summary of the programme for this craft appears at Tables 3 and 4. At the end of the plan period it is expected that there will be a total of 2,206 un-mechanized orus producing a total catch of 71,496 cwt. and 1,000 mechanized orus producing a catch of 108,000 cwt. The cost of this part of the project will be Rs. 1,500,000 for engines and Rs. 1,500,000 for gear, both figures being entirely foreign costs. This is shown in Tables XI to XV.

VALLAMS

There were 2,369 vallams registered in 1957 (Table II). The estimated catch from a vallam is 54 cwt. (6,000 lb.) a year and making the same assumption as in the case of orus that only 60 per cent of them are in actual use, it has been estimated that these craft accounted for 76,125 cwt. of the annual production in 1957.

It was considered that the only improvement related to this type of craft that could bring about an increase of yield would be mechanization and change of gear of the mechanized boats. Included among the vallams are large numbers of small boats that will be unsuitable for mechanization,

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while some of the big vallams will also be unsuitable because of their construction or their age. In addition, mechanization of the boats engaged in stake net fishing will not result in an increase in yield and it does not appear that any expansion of this type of fishing in the north is possible. For these reasons it was decided that provision should be made for the mechanization of only 500 vallams and that no increase should be expected from any improvements affecting the remaining boats (Tables III and IV).

Also provision has not been made for substituting these craft nor has any reduction in their numbers been anticipated as no evidence was available to indicate that either of these situations would arise.

On the average Rs. 8,000 will be required to mechanize a vallam and a further sum of Rs. 3,000 for the purchase of new gear. The present tendency in the north is to introduce engines of high H. P. and this tendency is responsible for raising the average cost to Rs. 8,000. The main form of investment in gear will be for long lines and the department expects that most, if not all the boats referred to in this section of the programme will operate over Pedro Banks on the North-East of the island.

A total investment of Rs. 4,000,000 will be needed for the purchase and installation of engines and Rs. 1,500,000 for the purchase of gear. The annual target for the boats is shown in Tables III and IV and estimated costs and production in Tables III, XII, XIII and XV. Practically the entirety of the funds required in this instance will have to be made available as loans from Government, free of interest and on the security of only the craft, engine and gear involved. Assuming an engine life of 7 years and a gear life of 3 years, periods of 4 years and 2 years respectively should be allowed for the recovery of the loan. The loan recoveries should be stepped so that more is recovered in the first year than in subsequent years as this will enable fishermen to attend to the repairs and replacements that will be necessary as this equipment ages, without straining their financial resources.

It is expected that the catch of the mechanized boats will be at least double the present catch. At the end of 1968 there will be 1869 non-mechanized vallams in operation producing 60,534 cwt. (Table IV) and 500 mechanized vallams producing 53,980 cwt. (Table III).

KATTUMARAMS

These craft are confined almost entirely to the North of the Island and 1,346 of them were registered in 1957. Each of those in actual use is estimated to produce 45 cwt. (5,000 lb.) and the craft as a group have accounted for 36,071 cwt. of fish in 1957. (Table II). Experiments in mechanizing these craft with outboard motors suggests that it can be successfully done and 6 fishermen on the North coast of Jaffna have, as a matter of fact, installed outboards in their kattumarams. The actual advantage of mechanizing the kattumaram lies in the fact that the craft can operate further away from shore, and is independent of the weather. The real improvement that affects fishing with these craft is related to the gear in use and it is considered that if the kattumarams resort to fishing with nylon nets they will be able to double their catch. Each kattumaram should be able to take a minimum of 12 pieces of nylon net, though one operator is actually using 20.

The programme now proposed provides for the mechanization of 200 kattumarams within 3 years of initiation of the plan, while within the same period each kattumaram in actual use whether or not it is mechanized will be assisted to replace its present gear with 12 pieces of nylon net. (Tables III and IV).

It is estimated that a sum of Rs. 1,500 will be required on the average to mechanize a kattumaram and a sum of Rs. 3,000 for the purchase of the necessary nets. Funds for both these investments will have to be made available as loans from Government, recoveries in respect of the engines being made within a year of issue and in respect of the nets, within 2 years of the issue. The cost of mechanization will be Rs. 300,000 and the cost of issue of new gear Rs. 2,662,800. The catch from kattumarams in 1968 is estimated to be 79,920 cwt. (Table VIII). The cost of 12 pieces of net will be about Rs. 3,000 and the fishermen should not be required to furnish security other than craft and gear as this development will be obstructed by any such requirements. Separate proposals are being made to reduce the risk of loss to a minimum. The programme is summarised in Tables XI-XV.

TEPPAMS

There are 3,946 of these craft registered of which 60 per cent. or 2,368 are assumed to be in regular use. Assuming also a production figure of 45 cwt. (5,000 lb. per year), these craft produced a total catch of 105,714 cwt. in 1957. The only form of improvement that can be adopted in respect of this type of fishing is to introduce more modern gear, viz., nylon nets and Table 4 indicates the proposals in respect of these craft. Each teppam can use 6 pieces of nylon net and the programme aims at supplying all the teppams in actual use with the required number of nets within the first 3 years. The catch is expected to go up by half and at the end of the plan period, i.e. 1968, these craft will be producing 157,709 cwt. of fish, the cost of introducing the nylon nets originally being Rs. 2,131,200.

The entire cost of supplying these nets will have to be made available through loans by Government and as the life of the gear is estimated at 3 years, repayments will have to be spread over 2 years.

It should be pointed out here that, as in the case of kattumarams, the security of the craft will be insufficient and the grant of a loan will naturally be a greater risk unless additional security is asked for. Such a requirement is bound to hinder, if not prevent the expeditious introduction of these nets and the greater risk will have to be taken. Separate proposals are being made to reduce the risk of default in loan repayments.

INTRODUCTION OF NEW MECHANIZED BOATS

The Japanese team in its report stated that the mechanization of craft is essential in order to develop production and the Department is on its own convinced that this is an essential development and one that will take place. What is necessary is to accelerate the pace and one of the aims of the programme is to do so.

Following the practice adopted by the Japanese team of assigning the production that cannot be obtained by other methods to new boats it has been estimated that a quantity of 2,744,750 cwt. of fresh fish will have to be produced from new mechanized boats to make up the total requirement of fish for consumption in 1968. Adopting the catch figures for each boat given by the Japanese, the allocation of boats has been revised as follows :—

5 to 10 tons ..	50
3 to 5 tons ..	500
Under 3 tons ..	7,700

There are certain differences from the Japanese programme which the Department considered necessary—

(*a*) The Department does not think that the larger boats could be introduced in the numbers recommended by the Japanese in the early years of mechanization. In the first place there is insufficient experience of mechanized boats among fishermen for them to take to larger mechanized craft and secondly investment of the larger sum of mony necessary may not take place until fishermen are satisfied that they can use the larger boats profitably. Finally harbours are essential for the use of these bigger boats and they will only be ready towards the end of the plan period. For these reasons the numbers have been revised as above from the figures of 500 and 2,000 recommended by the Japanese for the two larger classes and a proportionate increase made in the number of the smaller craft. It is quite possible, however, that in a few years, larger boats will be in greater demand and it will then be necessary to revise these figures.

(*b*) The estimated catch for the smaller craft according to the Japanese is 313 cwt. per year which works out to roughly 30,000 lb. The Departmental figures of production, however, though not based on either regular operations or regular collection of statistics seems to indicate that this figure is much too low and that it would not be unreasonable to expect catches in the neighbourhood of 1,000 cwt. or roughly 100,000 lb. At this level the operation is bound to be very profitable and the number of boats needed to achieve the target will fall in proportion.

(c) The department has also been unable to accept the Japanese figures for the cost of the three types of boats. The experience of the department at the moment is of course limited to boats of less than 3 tons where the actual price for a boat complete with engine varies from Rs. 10,000 to Rs. 15,000. The department thinks, however, that Rs. 15,000 is too high and the result of too low an output by each boat builder. Steps are being taken by the boat builders to expand their production and once this is done prices should fall. At the same time the Government Carpentry Corporation will also construct boats and it is hoped that their prices will be lower than and their boats as good as those available from other sources. The prices of the three classes of boat vary from the Japanese estimates as follows :—

	Japanese Team	*Departmental Estimate*
	Rs.	*Rs.*
Under 3 ton	7,420	11,000
3 to 5 ton	13,000	20,000
5 to 10 ton	27,000	40,000

The phasing for the introduction of these boats is given in Table VII. Though it is very unlikely that any effective change as regards harbours and shelters will be felt in the first 2 or 3 years, it was considered that existing facilities and the use of beach landing craft would enable the introduction of the number of the smallest class of boat programmed for these initial years. Thus Colombo, Negombo, Jaffna, K. K. S., Point Pedro, Trincomalee, Batticaloa, Hambantota, Tangalle, Weligama, Galle, Dodanduwa, Ambalangoda-Balapitiya, Bentota, Kalutara, &c., will all provide safe anchorages for at least one season and some of them for both seasons.

But in the later years of the plan, as the number of mechanized boats increases and the larger boats are introduced, harbours and shelters are definitely essential and must be constructed and be available for use.

The cost of introducing these new boats is shown in Tables VII and X and the cost of the gear necessary in Table XIII. The chief types of gear that can be used are long lines and synthetic nets. The estimated catch from these boats is also shown in Table VII.

The total cost of this part of the plan is Rs. 96,700,000 for boats and engines and Rs. 25,650,000 for gear, making a total of Rs. 122,350,000. The entire sum will have to be made available as loans from Government and the gross cost each year is shown in Tables VII, XI and XIII, while the nett cost based on a 5-year recovery period for boats and engines and 2 years for gear is shown in Table XXVI.

BOAT BUILDING YARDS

According to the present programme a considerable number of new mechanized craft are to be introduced into the Island's fisheries each year. The total is 8,250 while in the last year 970 boats will have to be made available and steps should be taken as recommended by the Japanese to set up boat building yards in which the annual requirements of boats will be constructed. As the life of each boat will vary from 10-15 years and as the demand for new mechanized boats will extend beyond the present plan period, the yards will have regular work in the future and will be a continuing source of increased employment.

The Japanese team has suggested the setting up of 25 yards—7 large and 18 small—at the 25 centres mentioned by them for the construction of harbours and shelters. This would however, make each yard comparatively small and instead it is now suggested that the Government Carpentry Corporation should set up one or more yards of the biggest suitable unit capacity so as to reduce the price of the boats by large scale production. At the same time the other boat builders should be given every encouragement. At the moment there are four such persons already turning out boats, while a few others have made inquiries and will probably start production soon.

One reason why the Japanese may have recommended as many as 25 yards is possibly that this would have made repair facilities available at each centre. The department is of the opinion that repair facilities will develop on their own as the carpentry skill required to repair boats is easily acquired if not already available along the coast. Further, within a few years, it is very likely that local groups of carpenters will organize themselves into making single boats to meet orders from local fishermen without calling themselves a boat building yard. This would be a very desirable development.

It is also suggested that an attempt be made to standardise on a few makes of engines as even now importing agents are offering special discounts on large orders. The benefits of these discounts can be passed down to the fishermen. In addition a limited number of makes will tend to improve service facilities and to reduce the price of spares and repairs.

Steps have already been taken to obtain the services of a boat builder through F. A. O. and the selected officer will be in the Island shortly.

The Japanese team has estimated an investment of Rs. 1,534,400 on shipbuilding yards and this figure has been retained here for investment in the first two years and appears in Table XXIV.

FISHERY HARBOURS

The largest increase in production in the plan that has been drawn up can be attributed to the new mechanized boats that are to be introduced. The figures are 2,744,750 cwt. out of an estimated production of 3,932,000 cwt. in 1968 (Table IX). This catch will be produced by a total of 8,250 boats of which 550 range from 3-10 tons and will certainly need harbours while harbours will still be required for the more regular operation of the majority of the smaller boats of under 3 tons.

Four types of boat are at present under construction for operation in the industry. Two of them will definitely not lend themselves to daily operation from a beach. Of the other two, one is a design that is regularly operated from the beach in Japan where it is drawn up daily with the aid of a winch. This type of boat is being constructed at Negombo while two were obtained as a gift from the Japanese Government at the end of October. The Department will be experimenting with these boats with a view to finding out to what extent the design will allow it to be used from the beach throughout the year on the coasts round Ceylon. The experts who have come with the boats from Japan admit that the beach does not shelve so steeply in Japan as in Ceylon but feel confident that the boat can be beached in most places in Ceylon and at most times. Whether this is in fact so, tests will show. The fourth design is one supplied by F. A. O. of a boat which the designers claim can be beached. A boat to this design has just been completed and trials will show to what extent the claims of the designers have been justified.

Apart from the success or failure of the designs claimed to be beachable, it will still be advisable to construct harbours and shelters to enable fishing to be done throughout the year. The Japanese themselves stressed that one of the most important factors in the development of fisheries is the availability of suitable harbours and set out the following as their observations on this need : (Extract from page 15 of the Japanese Report)

" 1. Several factors will assist in the establishment of low cost fishery harbours, they are—
  (*a*) Suitable topography of the area.
  (*b*) Existence of a bay or inlet already.
  (*c*) Absence of excessive wind or wave motion throughout the year.
  (*d*) Sufficient deep water berthing facility.

" 2. Such a fishery harbour when established must have suitable space in the area adjacent to the port for the provision of ice plant and store houses, fish market and halls, boat yards, and engine repair workshop.

"3. It would be preferable to develop an existing fishing centre where there is a high concentration of fishermen, craft, and high level of production.

"4. Good and well regulated transport facilities, road and rail, should be available through to the harbour itself.

"5. The purpose of a fishery harbour would be best served if sited close to the area of high fish consumption like a developed urban centre or a developing village.

"6. The fishery harbour must be centrally situated in relation to existing fishing grounds or those potentially capable of being developed."

The Japanese team recommended that there should be 7 large harbours and 18 smaller shelters in the place listed below :—

Harbours	*Shelters*	
Jaffna (Karaiyoor)	Pt. Pedro	Ambalangoda
Kalpitiya	K.K.S.	Balapitiya
Negombo	Velanai (Kayts)	Weligama
Mutwal	Mannar	Matara
Galle	Karaduwa	Tangalle
Batticaloa	Puttalam	Hambantota
Trincomalee	Chilaw	Kalmunai
	Kalutara	Valaichenai (Kalkudah)
	Beruwela	Mullaitivu

The Japanese team explained that the difference between a shelter and harbour was principally one of size, the main aim of the shelter being to provide safe anchorage for any craft that may be compelled to seek refuge during bad weather, but they pointed out that with the development of mechanized boats the need for these shelters would be even greater. The cost of these shelters and harbours was worked out on a per ton basis by the Japanese who had allocated a total of about 1,400 boats to the large fishing harbours and 2,850 boats to the shelters and assumed that all the other mechanized boats, about 4,000 in number, would be beached. A total sum of Rs. 120,370,000 was estimated by the Japanese as the cost of construction of these harbours and shelters and this figure has been adopted in the present programme.

However, the construction of so many works and the expenditure of such a large sum of money within the period of the plan would be beyond the capacity of the existing Government Departments who normally undertake these works, viz., the P. W. D. and Harbour Engineer. It is therefore recommended that a special organization be set up under foreign experts (consulting engineers) assisted by one or two Ceylonese engineers who could look after local interests, and that this organization should be assigned the responsibility for investigating, planning and designing the necessary harbours and shelters and for having them constructed within the plan period.

The same organization should also be entrusted with the responsibility for planning and designing the freezing, cold storage and ice making plants at the fishing centres at which harbours and shelters are to be constructed, as this would be the most expeditious manner in which these facilities could be provided and would also ensure that a co-ordinated design is adopted at each site and not one at which each amenity has been planned and sited without relation to the others.

At the same time there are certain works which should be tied up with existing plans, and these are the improvements necessary at Mutwal, K.K.S., Galle and Trincomalee and possibly also Hambantota where other Government Departments such as the Port Commission and the Salt Department have plans for development of harbours.

Discussions held with the Technical Working Group of the Planning Commission on the development of ports have indicated that the development of the fisheries harbours should proceed independently of the programme for the import-export harbours though the designs should fit into the main design for these ports. The plans for the development of Galle, Colombo and Trincomalee should not therefore be held up pending finalization of the larger plans and decision on them. The present report pre-supposes that the following developments will be complete in certain of these places in the time and for the purposes stated against each (Tables V and VI).

Colombo (Mutwal) : To take 2 additional trawlers each year from 1960 making a total with the existing trawlers of 10 in 1963 (which may however be limited to 8 by 1962) *and* 5 additional tuna boats by the end of 1961.

Galle : To take 5 new tuna boats in 1963.

Trincomalee : To take 4 new trawlers in 1961 and 3 in 1962 making a total of 7 to operate on Pedro Bank.

In addition to the above are the large number of small mechanized boats that have been allocated to each harbour.

The development of the fishery harbours at the above three places should not be held back pending completion of the import-export harbours but should be provided immediately with a view to having them completed within the target period laid down in this report.

The sum of Rs. 120,370,000 estimated as the cost of this section of the project has been allocated evenly over the last 9 years of the plan after providing Rs. 1 million for investigation and design in the first year. It has to be emphasized that unless all the work is approved and handed over for designing, it will be unlikely that the necessary harbours and shelters will be available at the end of the plan period.

REMOVAL OF OBSTRUCTIONS AND MINOR IMPROVEMENTS TO ASSIST NAVIGATION

In addition to the work that is necessary on harbours and shelters there is a considerable amount of work that has to be done all round the island to make the fishing beaches more accessible and safer for use by fishermen. Table XX is a list showing the places where such work is known to be necessary. The list is not complete and in the absence of estimates it is not possible to give a definite figure for the amount of money that may be necessary to effect these improvements. Tentatively it is suggested that a sum of Rs. 500,000 be set apart for this purpose.

LARGE SCALE FISHING

Three schemes for large-scale fishing are proposed, viz. :—

(*a*) Trawlers on Wadge Bank ;

(*b*) Trawlers on Pedro Bank ; and

(*c*) Pelagic tuna fishing boats.

WADGE BANK

This is a bank lying to the West of Ceylon with an estimated extent of three to four thousand square miles of which roughly half falls within the 40 fathom line. It is presently exploited by two trawlers belonging to the Ceylon Government, the " Braconglean " and the " Maple Leaf " which together produced 28,956 cwt., roughly 3 million pounds of fish in 1957. For a variety of reasons, chiefly poor shore facilities regarding which reference is made in para. 35 at seq., each of these boats does 17-19 trips a year, spending about 180 days at sea. With the improvement of those facilities proposed in this plan, it is expected that a boat should do at least 20 trips a year and bring in an annual catch of 15,660 cwt. as against 14,478 cwt. in 1957.

The Japanese in their report have recommended pair trawlers (bull trawlers) for this bank, but the Department does not agree with this recommendation for the following reasons :—

(*a*) Pair trawling means that if one member of a pair is under repair or unable to operate for any reason, the other has to idle.

(*b*) Wadge Bank is a hundred miles away from Colombo and it is considered that a single boat would be better than two.

(*c*) The staff costs for operating 2 boats would be higher.

(*d*) The present single boat trawl is very satisfactory on this Bank and no reason has been given by the Japanese why it should be changed.

A summary of the proposals for the exploitation of this Bank is given in Table V. It is proposed to introduce 2 additional trawlers each year starting from 1960 until a total of 10 trawlers for this Bank is reached in 1963. There is some opinion in the Department that this Bank will not take more than 6 or 8 trawlers, while other opinion suggests a higher number. Though it is very unlikely that a few years of operation will show whether over-fishing is taking place, evidence of this undesirable situation should always be looked for and some adjustment made to reduce the intensity of exploitation. How much difference of opinion there is on this matter may be seen when expert opinion varies from 6 trawlers by John and 10 by Hickling to "perhaps 20" by Blegvad.

The two present trawlers are about 135 feet each and are oil-fired steam vessels. It is considered that the new trawlers purchased for operation on both Wadge and Pedro Banks should all be standardised and should be about 100 to 125 feet and diesel-engined. The tuna boats, which will be referred to later, should also have as much as possible in common with these trawlers. This decision makes it necessary to start immediately on a plan to set up adequate diesel and electrical workshops staffed with well trained men. This question is referred to later in the section on "Repair Facilities".

The 10 trawlers referred to in this section will all be based in Colombo, though if more than this number are found possible at a later stage, they could operate without much difficulty from Galle. The present fishery harbour at Mutwal can handle 2 boats a week or perhaps 3 boats with difficulty. This means that additional harbour facilities and additional freezer and cold storage facilities will be necessary in 1960 or 1961 and the programme for the provision of those facilities will have to proceed accordingly.

PEDRO BANK

This is a bank of about 1,000 sq. miles in extent lying to the North-East of the island and comparatively close to it.

The Japanese report has recommended the introduction of small (50 ton) trawlers on this bank operating, some from Jaffna and some from Trincomalee. The department does not consider Jaffna very suitable as the boats will have to go round a long way to get to the bank and instead recommend that all the boats be operated from Trincomalee harbour. It is also recommended that 100-foot trawlers similar to those to be used for Wadge Bank be used on this Bank as well.

The operation of these trawlers will need provision of the necessary facilities at Trincomalee and subject to these being available by 1961, the plan is for 4 boats to be introduced in 1961 and 3 in 1962. The proposals for Pedro Bank are summarised in Table V.

PELAGIC LONG LINE TUNA BOATS

The Japanese report has recommended the introduction of 10 of these boats of the 250 ton class and capable of producing 15,624 cwt. of tuna each annually. Part of the catch will be frozen on board and each boat will be out for 5 to 6 weeks at a time.

While the Japanese team recommended the introduction of these 10 boats at the rate of 2 a year, the present plan is for the introduction of one each year in 1959 and 1960 in Colombo and 3 in 1961 when it is expected that adequate harbour and shore facilities will be available, and the balance 5 in 1963 for operation when the necessary facilities are available in Galle.

The proposals for these boats are summarised in Table VI.

STAFF FOR OPERATION OF TRAWLERS AND TUNA BOATS

According to the present plan there will be 28 large boats in operation from 1963 as against the 3 that are in operation now, namely, the two departmental trawlers and the tuna boat operated by a private concern. The tuna boat is manned entirely by Japanese officers while the crew is mixed Japanese and Ceylonese, while the two departmental trawlers have an entirely Ceylonese crew, but the officers are mixed, there being at the moment one British Skipper, one British Mate and one British Engineer, the management of the two ships being done by a Ships' Manager who is also a British Skipper.

Attempts made by the Department of Fisheries to train young men who could ultimately take up appointments as Skippers, Mates and Engineers have not been very successful. One reason for this failure has been the insistence of the Treasury that apprentices recruited for courses of training on the trawlers should be required to sign a personal bond with sureties in a sum of Rs. 10,000. This all the apprentices so far have refused to do and apprentices now on the ships have not signed their bonds, as the matter was under correspondence. A person who was selected a few months ago for training has not been appointed as he refused to sign the required bonds giving as his reason his inability to find sureties in the prescribed sum of money. The requirements have since been somewhat relaxed and a further attempt is being made to recruit the required trainees. As a result of qualified persons not being available it will be necessary to obtain skippers, mates and engineers and in all probability drivers qualified in diesel work from abroad. Excluding the three boats in operation at the moment, officers are required for 25 boats each of which will need a skipper, mate and an engineer, the crew being composed of drivers, greasers, serangs, seamen, cooks and stewards totalling about 20 for each boat. The crew can generally be obtained locally. Under existing conditions the following are the qualifications of the officers:—

Skipper: *U. K.* —Sea service of one year as Mate in a ship over 2.5 tons.

Ceylon—Sea service of one year as Mate in a ship over 50 tons.

Mate: *U. K.* —Sea service of 4 years of which 2 years should be on board fishing boats.

Ceylon—Sea service of 5 years on ship over 50 tons.

Engineer: *U. K.*—M.O.T. 5 years apprenticeship and 18 months sea service. (Less apprenticeship and more sea service is also allowed).

Insurance Certificate—Not available at the moment but this is a non-statutory certificate.

Ceylon—No regulations drafted yet, but G. E. & S. S. is contemplating the requirement of 3 years apprenticeship in a recognized Engineering Workshop. An amendment to the Merchant Shipping Act is necessary before regulations for this examination can be framed.

With the apprentices now on the trawlers it will be just possible in a few years to operate the two departmental trawlers without non-Ceylonese staff, but all the boats that are to be brought into service will need foreign staff to start with and steps should be taken immediately to put in as many apprentices as possible on the two trawlers so that qualified skippers, engineers and mates may be available in the future. If the Treasury requirements are preventing apprentices from signing on, the requirements should be modified immediately. Considering the advantages that the country will gain by having a large number of technically qualified persons, the correct thing to do would be to waive all surety requirements and select suitable persons for training without any promise of employment at the end of their training.

REPAIR FACILITIES

At the present moment the Department is having considerable difficulty in the repair and maintenance of its two trawlers. One particular aspect which always causes difficulty is the slip and dry dock which is never available when required as there is a considerable waiting list and the trawlers have to take their turn. The result is that quite often a trawler remains in harbour until the dock is available, an event which the harbour authorities appear unable to foresee accurately enough for the trawler to arrange to be in harbour when the dry dock is in fact available. Under the present programme there will be a total of 27 large boats operating from Colombo, Galle and Trincomalee. It is considered essential that an additional slip be constructed specially for the use of these boats and provision for this has been included in the plan with the provision for harbours.

The other delay experienced by the trawlers is due to the fact that private firms do not attend to trawlers' repairs with all the urgency that is considered necessary nor is the Department itself sufficiently well equipped at the moment to undertake all but the smaller repairs though steps are being taken to expand the present Machine Shop at Mutwal for the purpose of expediting repairs as well as cutting down their costs. Allowing for the number of large boats that will be in iperation, it is considered that a very much better equipped repair shop is essential in Colombo while smaller repair shops should be set up at Trincomalee and Galle. It is proposed that Rs. 1 million should be spent for this purpose in Colombo and Rs. 250,000 at Galle and Trincomalee. The phasing of the expenditure is shown in Table XXIV.

As regards repair facilities for the smaller engines, there is at present a great dearth of trained diesel mechanics. A diesel engine requires more careful and more delicate adjustment than a petrol engine and it is necessary that training institutions should be informed of the plan to introduce a large number of diesel engines into the Industry so that their training programmes should be modified to turn out a larger number of mechanics who can undertake diesel repairs. This will serve to provide cheaper facilities to the fishermen than setting up a large number of repair shops on a more elaborate scale.

FREEZING, COLD STORAGE, ICE PRODUCTION AND ICE STORAGE

The Japanese team has in its report emphasized the importance of proper preservation of fish during transport and storage and drawn attention to the fact that in Ceylon there appears to be an insufficient realization of the importance of quality on market price. Their report has recommended what is the generally accepted rule that the quantity of ice should equal the quantity of fish being preserved. Following the principles adopted by the Japanese in their report the requirements of ice in 1968 will be as follows:—

	Tons
(*a*) For 10 pelagic long line boats	1,050
(*b*) For 17 additional trawlers at 20 per cent. of total catch per boat	2,660
(*c*) For 507·5 ton boats at 10 per cent of catch per boat	190
(*d*) For transport of 60 per cent. of production as wet fish with an equal quantity of ice	118,000
Total	121,900

On this basis the daily production of ice will have to be approximately 660 tons or (say) 600 tons by new ice plants.

The Japanese rate of Rs. 24,000 per ton for the construction of an ice plant is too low as the buildings alone for 5 ton ice plants now in operation have in fact cost over Rs. 100,000. A rate of Rs. 36,000 per ton has been adopted here, i.e., a 50 per cent. increase over the Japanese figures which have been increased by this factor in all the items scheduled below. An additional freezer has also been included for installation at Trincomalee to cope with the production of fish by the trawlers operating on Pedro Bank.

	Rs.
(*a*) ice production 600 tons per day	21,600,000
(*b*) ice storage sufficient for 10 times the daily ice production as against the figure of 25 used in Japan estimated	4,320,000
(*c*) freezing and cold storage facilities :	
(i) 200 tons storage in 6 major producing areas *i.e.* Negombo, Kalpitiya, Jaffna, Batticaloa, Trincomalee and Galle	3,024,000
(ii) 5 ton per day freezing Plant at Galle and Trincomalee	432,000
(iii) 50 ton cold storage in the 18 minor fishing centres	2,268,000
(iv) 600 tons cold storage in Colombo, Kandy	1,512,000
	33,156,000

Reference has already been made in a previous paragraph regarding the manner in which these works should be constructed, namely, that they should be given out to foreign contractors to plan, design and have constructed. The phasing of this expenditure is shown in Table XXIV.

TRANSPORT

The Japanese team has made certain recommendations as regards the provision of adequate transport facilities for fish and these recommendations have been adopted for the purpose of the plan.

First among these recommendations is the introduction of 40 insulated rail freighters, each with a capacity of 6 tons and a cost of Rs. 80,000. The total investment involved will be Rs. 3,200,000 and these freighters are expected to carry 24,000 tons of fish annually. Though they are included in this plan, they really should form part of a scheme for the development of the railway and the G. M. R. should decide on their introduction. Their profitable operation from the railway's point of view will depend on the patronage they receive and this in turn will depend on the service the railway can offer and the cost of such services. It should however be possible to introduce this type of rail transport immediately, starting off with one or two such wagons and placing them on a particular line during a time when heavy transport is expected and offering a better, cheaper and quicker service than the present road transport can. This however is a matter for the G. M. R. to investigate and decide on, as his is a commercial undertaking.

That the road transport referred to by the Japanese will be required is certain and provision should be made in the plan for the 200 lorries recommended by them at an estimated cost of Rs. 5,850,000 in addition to 20 insulated retail vans costing Rs. 400,000 bringing this total up to Rs. 6,250,000.

That there should be a Government Corporation to handle certain aspects of the expanding industry is one of the recommendations being made later in this report, but the extent to which this Corporation, even though it handles the purchase and sale of fish, should engage in fish transport instead of depending on non-Government transport contractors is a question on which it is difficult to make a recommendation at this stage. At the moment, the opinion is that the private transport contractor can offer much more competitive rates than can any Government Organization or for a matter of that most organized bodies. Many private transporters are owner-operators and not handicapped by Wages Boards, overtime rates, &c., which add to the costs of operation of organized bodies employing operators. Thus it is generally admitted that the Co-operative Fish Sales Union cannot compete in transport with private transport agents. Should the Corporation undertake transport, the service may cost more, resulting in lesser payments to the producer of fish and higher prices to its consumer.

No allocation of any part of this expenditure to Government has therefore been made.

The Planning of the expenditure is shown in Table XXIV.

MARKETING FACILITIES

The Japanese report has made mention of the very poor marketing arrangements that exist at present. Fish is generally auctioned on the beach as it is landed and quite often there is no auction shed of any kind. Considering how scattered along the coast the landing points are, it is not surprising that competition is poor or non-existent and that the prices paid to the producer are low in relation to the prices paid for fish by the final consumer. Even where there are organized auction sheds, as for example, in Negombo, conditions are not sanitary and facilities are not available for the proper washing and packing of fish prior to transport.

To remedy this situation, the Japanese have recommended the construction of a number of wholesale markets built in close proximity to the ice and cold storage plants. These markets would serve to centralize the fish auctions of a reasonable area around them, would attract a large number of persons who want to purchase fish and thus lead to higher prices to the producer, while the fish itself could be handled in a manner more fitting a foodstuff and be available in a better state of preservation than is generally now the case. These centralized auction sheds and storage points would mean that better fish transport facilities would be required. Steps will have to be taken to organize the producers in each centre into a co-operative society or other body through which fish can be collected and supplied to the wholesale market.

Bad marketing is responsible to a great extent for the failure of the industry to develop. Producers generally get only half and quite often less than half the prices that consumers pay for fish, the difference being taken up by packing and transport and the one or two persons who enter the trade as intermediaries between the producer and the consumer. Much study and experiment will be necessary before a satisfactory marketing structure can be developed but without going into greater detail at this stage it can be definitely stated that the construction of markets at the chief fishing centres is essential. The Japanese team has recommended 7 large markets at the main fishing centres and 18 smaller depots at the smaller centres at a total estimated cost of Rs. 2,570,000. The team has used a rate of Rs. 18.9 per square foot for building construction for the large markets and half this rate for the smaller. This may give too low a rate for the smaller buildings but the original figure has been retained here as no other information is available. This expenditure has been included in Tables XXIV and XXV.

FISH PROCESSING AND CURING

As the plan aims at self sufficiency within the 10-year programme, it is too early to consider processes such as canning which presume a large surplus production. Trials and experiments in canning and other methods of processing not at present in use in the Island should be conducted but for the present the only large-scale processing is likely to be drying and salting and it is not expected that any considerable expenditure will have to be incurred in this connection.

With improved transport and improved methods for preserving wet fish, it is expected that the consumption of dry fish will go down to 40 per cent. of all consumption from the present figure of 70 per cent.

DEVELOPMENT OF FRESH AND BRACKISH-WATER FISHERIES

Special efforts are at present being made to develop the fresh and brackish-water fisheries of the Island.

The fresh-water fisheries expansion is under the joint direction of a Superintendent and a Research Officer assisted by less than half a dozen junior officers while the brackish-water section consists of a Superintendent and a junior officer.

The programme for development can be divided up into the following principal sub-heads :—

(*a*) Improvement of waters, e.g., by cutting outlets into the sea, deepening sections of village tanks so that stocks of fish can tide over the dry season and breed and re-populate tanks during the rainy season ;

(*b*) Breeding and rearing suitable varieties of fish, and stocking of waters, measures to enable and assist stocks to breed under natural conditions ;

(*c*) Extension work : inducing the public to rear fish for popularising the consumption of fresh-water and brakish-water fish ;

(*d*) Improving methods of exploitation and intensifying exploitation for greater production. Introduction of new fishing gear ;

(*e*) Improvements in marketing and processing ;

(*f*) Research : Investigations into the suitability of local species and experiments with new foreign types ;

(*g*) Legislation for conservation of fish stocks for maximum production.

The fresh-water areas of the Island are estimated to have a total extent of 200,000 acres while the brackish waters, river estuaries, lagoons and salt marshes cover an area of 350,000 acres. Though no reliable estimate of the catch from inland waters is available it probably is in the region of 1 million pounds. It should be possible to raise this to about 6 or 7 million pounds.

The fresh-water division is now operating from stations in Colombo, Polonnaruwa and Wathupitiwela and these stations should be improved and expanded so as to enable a stock of at least 1 million fish a year to be raised. It is also very likely that an additional station may become necessary in the North-West sector of the Island. The chief requirement, however, is staff and an immediate expansion by one additional graduate officer on the scale Rs. 4,080—13,200 and three fish culture assistants on the scale Rs. 1,620—5,820 is essential, while further staff should be provided as development proceeds. It is necessary to point out here that a Research Officer is now engaged in fresh-water development, instead of carrying out fresh-water research for which he has been specially trained. In addition to the specialist staff mentioned above, extension staff and minor staff for the stations and stocking programmes should be made available.

The brackish-water division has just opened a station at Pitipane. It will be necessary to develop and expand this station and to open out a second station in the North-East section and to provide more junior staff for the section, starting off immediately with one fish culture assistant for the present station.

Apart from the staff requirements, a sum of Rs. 3½ million should be provided for the development of these fisheries. In addition, loans should be available to inland water fishermen for purchase of better gear on the same favourable terms as for those who fish in the sea. The number engaged in inland fisheries is small in comparison, probably 700 or 800, and no separate provision is shown for them.

The expenditure proposed for the development of inland fisheries has been included in Tables XXIV and XXV.

RESEARCH

There are 9 Research Officers in the Department of whom 3 are abroad on training at present. The Japanese team has recommended an expansion of the Research Division to 39 Research Officers and also added that the Research Division should be provided with 3 small mechanized boats for their research. One such boat has already been allocated to the Research Division by the Director, namely, the " Canadian ", and provision should be made for two more boats of similar size to be obtained as the research section expands. The two research vessels will probably cost about Rs. 200,000 each and provision has been included for them.

Two or three field research stations should also be constructed in the North, South and East and provision in Rs. 200,000 has been made for this purpose.

MARINE AQUARIUM

The Department is at the moment without a suitable Marine Aquarium and it is recommended that immediate action is taken to set up a Marine Aquarium, part of which can be also a Public Aquarium. If such a public Aquarium is situated on the block of land that is available to the west of the present research station there is every possibility of it earning enough revenue to be self-supporting, considering the number of people that are likely to patronise it from among those who visit Galle Face green every evening. As the present research station is hardly large enough to accommodate 39 research officers, the new Aquarium building could also include accommodation for research officers and at a rough estimate a sum of Rs. 500,000 may be set apart for the purpose of providing a Marine Aquarium and additional space for research officers and laboratories.

MANUFACTURE OF FISHING GEAR

An examination of this plan would show that a considerable expenditure has to be incurred each year on the purchase of fishing gear. This has been roughly estimated at Rs. 35 million for the plan period (Table XIII) and the greater part of this will be the cost of synthetic nets and lines and fish hooks. At the present time all these materials are imported and steps should be taken to set up machinery to manufacture fishing gear in Ceylon. One firm is reported to be negotiating for machinery that will enable them to spin terylene yarn and make nets and lines locally while another firm has similar proposals for nylon. Such proposals should be given every encouragement as considerable saving in foreign exchange will result if only raw materials are imported instead of the final manufactured product. In addition a local net and line making industry will result.

MISCELLANEOUS MATTERS

The Japanese team has touched on a large number of matters which are too detailed to be reported on in this plan at this stage. Very briefly, the recommendations made in the Japanese report should be proceeded with but particular mention should be made of the following, which merit special mention :—

(*a*) Suitable amendments of the Launches Ordinance to regulate the persons who may operate mechanized fishing boats.

(*b*) More intensive programme for the development of Fishery Co-operatives.

(*c*) Development of Fishery roads.

(*d*) Setting up Training Schools for fishermen under the aegis of the Department of Fisheries and expansion of the present extension service.

ORGANIZATION OF THE DEPARTMENT AND MANAGEMENT OF THE PLAN

With the expansion of the industry the Department of Fisheries will have to expand considerably and more staff will be required than is now available. It is not possible within the limited time available to make any form of recommendation as to the numbers and grades of staff that will be required but it is necessary to point out that the success of the plan will depend to a very large extent, if not entirely on the availability of suitable staff in sufficient numbers to enable every phase of development to be followed up effectively. One big question arises at this time—can a Government Department under the strict and rigid control of the Treasury be engaged in the following functions which are likely to be financed by Government :—

(*a*) Operations of trawlers, pelagic tuna boats and related facilities such as repair shops ;

(*b*) Operation of freezeers, cold storage and ice plants ;

(*c*) Management of wholesale markets ;

(*d*) Management of fisheries harbours and shelters ;

(*e*) Operation of insulated road transport ; and

(*f*) Marketing of fish where necessary.

The answer that suggests itself immediately is " No. Set up a Government Corporation to undertake these operations ". On second thoughts, however, a little bit of doubt begins to creep in as to whether a body of persons in a Government organization can in fact function more effectively than can a single Government officer alone responsible for decisions and alone answerable for his mistakes.

This is a problem that will have to be gone into immediately and carefully. Though a Government Corporation appears to be the solution, it may still be better to ask the Department of Fisheries to undertake these operations and to come to some agreement with the Treasury by which the difficulties caused by the financial regulations can be overcome. If, however, a Corporation is decided on as necessary the following functions should be taken over by it :—

(*a*) to purchase and operate fishing vessels of all types ;

(*b*) to set up and operate repair shop for fishing vessels ;

(*c*) to engage in the purchase and sale of fish ;

(*d*) to engage in the processing of fish ;

(*e*) to construct and operate freezing ice and cold storage plants ;

(*f*) to operate vehicles for the transport of fish ;

(*g*) to organize and operate wholesale and retail fish markets ;

(*h*) to control purchase, sale and transport of fish by private persons both wholesale and retail ;

(*i*) to import and export fish and fish products ;

(*j*) to import for its own use or for others, requirements for fishing ;

(*k*) to conduct experiments for the improvement of the industry ;
(*l*) to lay down standards of quality for fish and fish products ;
(*m*) to give loans for the development of fisheries ; and
(*n*) to insure fishing craft against loss or damage.

FINANCE

The plan now proposed clearly depends to a very great extent on the availability of capital for investment. The total investment envisaged over the 10-year period amounts to Rs. 349 million (Table XXIV). This expenditure should result other things being equal, in a catch of 3,933,957 cwt. or 440 million lb. If this is valued at the fairly moderate average figure of 40 cts. a lb. the total value of this output will be Rs. 176 million as compared to an estimate of Rs. 34 million in 1957.

Part of the money required for this investment programme will not or is very unlikely to be produced by the private sector and will be the responsibility of Government. In this class would come the following :—

(*a*) Trawlers and tuna boats ;
(*b*) Repair shops for the above ;
(*c*) Construction and operation of freezer, cold storage and ice plants ;
(*d*) Construction of wholesale markets ;
(*e*) Construction of fishery harbours and shelters ; and
(*f*) Insulated road transport.

On the other hand certain proposals made in this report will normally be undertaken by the private sector if it can find the capital. Considering how poor as a class the fishermen are it will therefore be essential to provide credit facilities on the most favourable terms possible and considering the importance of the development now proposed to the national economy, loans free of interest and with the minimum security would not be unreasonable. In the operation of the credit scheme for granting loans to individual fishermen the Department has found that the greatest difficulty the firshermen have in obtaining a loan is to offer adequate and acceptable security. Should the credit offered for the proposals now made be subject to the same difficulties from the fishermen's point of view, development is going to be very much retarded. The purpose for which credit will be wanted under this plan will generally be for purchase of gear, boats and engines and it is now recommended that the articles purchased be the only security obtained for the due repayment of the loan. This principle has already been adopted in the credit scheme operated by the department under which loans are given to fisherman to purchase mechanized boats, engines and gear for the operation of these boats.

The gross cost to the Government of implementing this programme over the 10 years is presented in Table XXV. Certain items in this development programme have necessarily to be carried out by the State ; some of these are the construction of fishery harbours, refrigeration plants and wholesale markets. There are other projects such as the purchase and operation of trawlers, which in the context of conditions prevailing in Ceylon, are likely to be implemented only by the Government. Finally, there are still others which will be undertaken by the private sector but for which the Government will have to provide the credit ; these are the schemes for the purchase of new mechanized boats, engines and gear. The total of all these amounts to Rs. 340 million.

However, the money spent by the Government on financing projects in the third category will ultimately be recovered in its entirety. The scheme for the recovery of these loans naturally varies with the type of the engine or boat that is purchased. Thus the cost of a new mechanized boat will be recovered in five unequal instalments while the loan for the purchase of an engine for an oru will be recovered in a single year. This means in effect that the total loans extended under this scheme will not be recovered within the 10-year period. There will be some carry over of loan recoveries into the succeeding plan period. Table XXVI shows the recovery by the Government of loans granted to operators for the purchase of these various items. This amounts to Rs. 102 million over the 10 years. The nett cost to the Government of this 10-year programme is also shown in the same Table. The gross cost less recoveries is Rs. 237 million.

One way, however, to ensure repayment of the loans may possibly be to impose conditions that the borrower will market his fish through an approved person or agency through whom a proportion of the proceeds of the sale of the catch could be collected to be set off against the loans. If this condition can be given statutory effect by, for instance, regulations being framed under the Fisheries Ordinance, the issue of these loans would be at very little risk. An amendment of the Ordinance is of course necessary but considering the benefits offered to the industry the proposals are likely to prove quite acceptable.

There is also another question that should receive attention and that is the need for working capital, lack of which has often handicapped development in other fields. In fisheries it is known for instance that persons need credit from day-to-day to purchase ice. The need for this type of credit should be looked for and provision made for credit to be available in a suitable manner.

It is estimated that there are approximately 79,000 persons directly engaged in catching fish. This figure has been derived by applying to the number of boats in use in 1957, the number of people required to man these craft. On the same basis by 1968 the numbers directly engaged in fishing would have risen to 92,000. The increase is therefore of the order of 13,000 persons. This, however, does not take account of the supplementary employment that would be generated as a result of development in this sector. Unfortunately, no estimate of such supplementary employment is available but there is no doubt that it will be quite substantial, especially as, unlike as at present, the total requirements of fish will be produced domestically ; hence there has necessarily to be an expansion in many subsidiary industries, such as boat building, fish curing, transport and distribution, &c. As a matter of interest the productivity per person directly engaged in fishing has also been calculated. The present output of fish is 762,301 cwt. which is caught by 79,000 persons. The output per person is 9.6 cwt. or 1,075 lb. In 1968 the catch would have risen to 3,934,000 cwt. while the numbers engaged in fishing would be 92,000 persons. The productivity per person would thus be 42.8 cwt. or 4,793 lb. To express it in another way, the gross productivity of a fisherman at present would be around Rs. 430 a year while in 1968, once this programme has been implemented, the gross productivity of a fisherman would be close to Rs. 2,000 a year.

Attention must finally be drawn to the fact that the plan as presented does not reflect the administration cost of proceeding with it. The chief reason for the failure to include this was lack of time. It cannot be too strongly stressed that for its fulfilment the ultimate success of the plan depends on the staff required being provided for as part of it.

TABLE I

Estimated Fish Consumption during Plan Period

	Trawlers	*All Other Craft*	*Total*
Total domestic production in 1957	28,956 (Cwt.)	732,345 (Cwt.)	761,301 (Cwt.)

(Source : Director of Fisheries)

Imports of fish and fish products in 1957 : 2,130,420 cwt. (In wet fish equivalent). Dried fish has been converted into wet fish on a conversion ratio of 35 per cent.

(Source : Customs Returns)

Total consumption in 1957	2,891,721 cwts.
Population on 30th June, 1957	9,165,000
Consumption per caput in 1957	0·32 cwt. (i.e., 36 lb.)

The Consumer Finance Survey yielded 17·62 lb. on the average consumption of fish per head per year. If the imports of 1957, in unconverted terms 787,736 cwt. are added to local production 761,301 cwt. totalling 1,550,037 cwt. per caput consumption amounts to 16·9 lb. in that year.

Calculation of Future Requirements

	1959	*1960*	*1961*	*1962*	*1963*	*1964*	*1965*	*1966*	*1967*	*1968*
Population	9,720·4	9,987·0	10,252·6	10,525·3	10,805·2	11,092·6	11,387·7	11,680·5	11,980·9	12,289·0
(Source : Planning Secretariat)										
Total consumption requirements at 0·32 cwt. per head ('000 cwt.)	3,111	3,196	3,281	3,368	3,458	3,550	3,644	3,738	3,834	3,932

TABLE II

Number of Craft now in use and their Estimated Catch, 1957

Type of Craft	*No. in Existence*	*No. in Actual Use**	*Average Annual Catch per craft in Actual Use in (lb.)*	*Total Catch*	
				(000 lb.)	*(Cwt.)*
Orus	6,306	3,784	6,000	22,704	202,714
Vallams	2,369	1,421	6,000	8,526	76,125
Kattumarams	1,343	808	5,000	4,040	36,071
Teppans	3,946	2,368	5,000	11,840	105,714
Other craft and methods (excludes beach seine)	—	—	—	2,104	18,783
Sub-Total	13,967	8,381	—	49,214	439,407
Beach Seine †	—	—	—	32,806	292,938
Total	13,967	8,381	—	82,023	732,345

(Source : Director of Fisheries)

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* It is assumed that only 60 per cent. of the craft in existence is in actual use in any year. This factor is to take account of the differing seasons, periods of bad weather, &c., which precludes each craft being used each day of the year.

† It is estimated that Beach seine fisheries to account for 40 per cent. of the total catch.

TABLE III

The Mechanization Programme for Existing Craft

	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968
(a) *Vallams*										
Number to be mechanised annually	50	75	100	125	150	—	—	—	—	—
Cumulated	50	125	225	350	500	500	500	500	500	500
Output										
Present catch from craft to be mechanized at 54 cwt. each	2,700	4,040	5,400	6,750	8,100	—	—	—	—	—
Increase in annual catch (54 cwt. or 6,000 lb.)	2,700	4,040	5,400	6,750	8,100	—	—	—	—	—
Annual catch from mechanised boats	5,400	8,080	10,800	13,500	16,200	—	—	—	—	—
Cumulated catch from mechanised boats	5,400	13,480	24,280	37,780	53,980	53,980	53,980	53,980	53,980	53,980
Cost										
The cost of mechanizing each vallam is estimated at Rs. 8,000 (Rs. '000)	400	600	800	1,000	1,200	—	—	—	—	—
Cumulated (Rs. '000)	400	1,000	1,800	2,800	4,000	4,000	4,000	4,000	4,000	4,000
(b) *Orus*										
Number to be mechanized annually	100	250	300	350	—	—	—	—	—	—
Cumulated	100	350	650	1,000	1,000	1,000	1,000	1,000	1,000	1,000

TABLE III—*(contd.)*

The Mechanization Programme for Existing Craft—*(contd.)*

	1959	*1968*	*1961*	*1962*	*1963*	*1964*	*1965*	*1966*	*1967*	*1968*
Present output at 54 cwt. each)	5,400	13,500	16,200	18,900	—	—	—	—	—	—
Increased output at 6,000 lb. extra or 54 cwt.	5,400	13,500	16,200	18,900	—	—	—	—	—	—
Annual catch from mechanized boats—cwt.	10,800	27,000	32,400	37,800	—	—	—	—	—	—
Cumulated catch from mechanised boats—cwt.	10,800	37,800	70,200	108,000	108,000	108,000	108,000	108,000	108,000	108,000
Cost 1,500 per boat (Rs. '000)	150	375	450	525	—	—	—	—	—	—
Cumulated	150	525	975	1,500	1,500	1,500	1,500	1,500	1,500	1,500
(c) *Kattumarams*										
No. mechanized annually	25	50	125	—	—	—	—	—	—	—
Cumulated	25	75	200	200	200	200	200	200	200	200
Present output (45 cwt. each)	1,125	2,250	5,625	—	—	—	—	—	—	—
Increase in catch after mechanization—5,000 lb. o, 45 cwt.	1,125	2,250	5,625	—	—	—	—	—	—	—
Annual catch from mechanized boats—cwt.	2,250	4,500	11,250	—	—	—	—	—	—	—
Cumulated catchfrom mechanized boats—cwt.	2,250	6,750	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000
Cost Rs. 1,500 per boat	37,500	75,000	187,500	—	—	—	—	—	—	—
Cumulated (Rs. '000)	375	113	300	300	300	300	300	300	300	300

TABLE IV

Catch from Unmechanized Craft

	1959	*1960*	*1961*	*1962*	*1963*	*1964*	*1965*	*1966*	*1967*	*1968*
(*a*) ***Orus***										
Number at beginning of each year	6,306	5,891	5,326	4,711	4,096	3,781	3,466	3,151	2,836	2,521
Number going out of production each year (5 per cent.)	315	315	315	315	315	315	315	315	315	315
Number being mechanized annually	100	250	300	350	—	—	—	—	—	—
Number at end of year (unmechanized)	5,891	5,326	4,711	4,096	3,781	3,466	3,151	2,836	2,521	2,206
Number in actual use (60 per cent.)	3,535	3,196	2,827	2,458	2,269	2,080	1,891	1,702	1,513	1,324
Catch from those in actual use at 54 cwt. each	190,890	172,584	152,658	132,732	122,526	112,320	102,114	91,908	81,702	71,496
(*b*) ***Vallams***										
Number in existence	2,369	2,319	2,244	2,144	2,019	1,869	1,869	1,869	1,869	1,869
Number mechanized	50	75	100	125	150	—	—	—	—	—
Number unmechanized	2,319	2,244	2,144	2,019	1,869	1,869	1,869	1,869	1,869	1,869
Number in actual use	1,391	1,346	1,286	1,211	1,121	1,121	1,121	1,121	1,121	1,121
Catch from those in use at 54 cwt. each	75,114	72,684	69,444	65,394	60,534	60,534	60,534	60,534	60,534	60,534
Catch from Craft using Improved Gear										
Catch from existing Trawlers										
Wadge Bank. 2 existing trawlers at 15,660 cwt. each	31,320	31,320	31,320	31,320	31,320	31,320	31,320	32,320	31,320	31,320
Beach Seine Fisheries										
2 per cent. decline annually. 1957 production is estimated at 292,938 cwt.	281,220	275,362	269,503	263,644	257,785	251,927	246,068	240,209	234,350	228,492

TABLE IV—(contd.)

Catch from Craft using Improved Gear—(contd.)

	1959	*1960*	*1961*	*1962*	*1963*	*1964*	*1965*	*1966*	*1967*	*1968*
(*a*) ***Teppams***										
Number of teppams introducing 2 pieces of nylon net	2,368	2,368	2,368	—	—	—	—	—	—	—
Pieces of nylon net introduced annually	4,736	4,736	4,736	—	—	—	—	—	—	—
Cumulated (pieces of nylon net)	4,736	9,472	14,208	14,208	14,208	14,208	14,208	14,208	14,208	14,208
Number of non-nylon nets	9,472	4,736	—	—	—	—	—	—	—	—
Annual catch from nylon nets at 11.1 cwt. per net	52,570	105,139	157,709	157,709	157,709	157,709	157,709	157,709	157,709	157,709
Annual catch from non-nylon nets at 7.4 cwt. per net	70,093	35,046	—	—	—	—	—	—	—	—
Total annual catch from Teppams	122,663	140,185	157,709	157,709	157,709	157,709	157,709	157,709	157,709	157,709
Cost of introducing nylon nets at Rs. 150 per net (Rs. '000)	710	710	710	—	—	—	—	—	—	—
Cumulated (Rs. '000)	710	1,420	2,131	2,131	2,131	2,131	2,131	2,131	2,131	2,131

Instead of mechanization teppams should use improved gear, in the form of nylon nets. Each teppam carries 6 pieces of net. It is assumed that each teppam in effective use will introduce 2 nylon nets each year, i.e. in 3 years it would have its full complement of 6 nylon nets. As the effective strength of the teppams are 2,368, the total number of nets are 14,208 pieces.

	1959	*1960*	*1961*	*1962*	*1963*	*1964*	*1965*	*1966*	*1967*	*1968*
(*b*) ***Kattumarams***										
Number in existence	1,346	1,321	1,271	1,146	1,146	1,146	1,146	1,146	1,146	1,146
Number mechanized	25	50	125	—	—	—	—	—	—	—
Number unmechanized	1,321	1,271	1,146	1,146	1,146	1,146	1,146	1,146	1,146	1,146
Number in actual use	793	763	688	688	688	688	688	688	688	688
Catch from unmechanized kattumarams after introduction of improved gear	71,370	68,670	61,920	61,920	61,920	61,920	61,920	61,920	61,920	61,920

TABLE V

Programme for the Introduction of Trawlers

	1959	*1960*	*1961*	*1962*	*1963*	*1964*	*1965*	*1966*	*1967*	*1968*
Trawlers for Pedro Bank										
Nos. to be purchased annually	—	—	4	3	—	—	—	—	—	—
Cumulated	—	—	4	7	7	7	7	7	7	7
Catch : the same yield figure as for the trawlers in operation on the Wadge Bank is adopted i.e., 15,600 cwt.	—	—	62,640	46,980	—	—	—	—	—	—
Cumulated	—	—	62,640	109,620	109,620	109,620	109,620	109,620	109,620	109,620
Cost :. Annually Rs.000	—	—	6,000	4,500	—	—	—	—	—	—
Cumulated	—	—	6,000	10,500	10,500	10,500	10,500	10,500	10,500	10,500
Trawlers for Wadge Bank										
Nos. to be purchased annually	—	2	2	2	2	—	—	—	—	—
Cumulated (including the two trawlers already in use)	2	4	6	8	10	10	10	10	10	10
Catch from existing 2 trawlers cwt.	31,320	31,320	31,320	31,320	31,320	31,320	31,320	31,320	31,320	31,320
Catch from new trawlers (cwts.)	—	31,320	62,640	93,960	125,280	125,280	125,280	125,280	125,280	125,280
Total catch from trawlers on Wadge Bank	31,320	62,640	93,960	125,280	156,600	156,600	156,600	156,600	156,600	156,600
Cost : Annually Rs. '000	—	3,000	3,000	3,000	3,000	—	—	—	—	—
Cumulated Rs. '000	—	3,000	6,000	9,000	12,000	12,000	12,000	12,000	12,000	12,000

TABLE VI

Programme for the Introduction of Pelagic Tuna Boats

Tuna Boats

1 Tuna boat, privately owned is already in use. Its annual output has been estimated at 6,616 cwt. on the basis of its having caught 493,997 lb. or 4,411 cwt. over 8 months.

	1959	*1960*	*1961*	*1962*	*1963*	*1964*	*1965*	*1966*	*1967*	*1968*
No. to be purchased annually	1	1	3	—	5	—	—	—	—	—
Total in use (cumulated plus existing one)	2	3	6	6	11	11	11	11	11	11
Output										
(*a*) From existing boat (cwt.)	6,616	6,616	6,616	6,616	6,616	6,616	6,616	6,616	6,616	6,616
(*b*) From new boats at 15,624 (cwts.) per boat each year (Source : Japanese Report) catch (cwt.)	15,624	31,248	78,120	78,120	156,240	156,240	156,240	156,240	156,240	156,240
Total	22,240	37,864	84,736	84,736	162,856	162,856	162,856	162,856	162,856	162,856
Cost										
Annual cost at 1·5 million each (Rs. '000)	1,500	1,500	4.500	—	7,500	—	—	—	—	—
Cumulated Rs. (00	1,500	3,000	7,500	7,500	15,000	15,000	15,000	15,000	15,000	15,000

TABLE VII

The Programme for Introduction of New Mechanized Boats

	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968
New Mechanized Coastal Fishing Boats										
Number introduced annually—										
(*a*) Boats of 7·5 tons		—	—	—	—	—	5	10	15	20
Cumulated	—	—	—	—	—	—	5	15	30	50
(*b*) Boats of 4 tons	—	—	—	—	50	100	200	300	400	100
Cumulated	—	—	—	—	50	50	100	200	300	500
(*c*) Boats of 2 tons	500	750	800	800	800	800	800	800	800	850
Cumulated	500	1,250	2,050	2,850	3,650	4,450	5,250	6,050	6,850	7,700
Output										
(*a*) Catch from 7·5 ton boats at 733 cwt.	—	—	—	—	—	—	3,665	7,330	10,995	14,660
Cumulated	—	—	—	—	—	—	3,665	10,995	21,990	36,650
(*b*) Catch from 4 ton boats at 596 cwt.	—	—	—	—	29,800	29,800	59,600	59,600	59,600	59,600
Cumulated	—	—	—	—	29,800	59,600	119,200	178,800	238,400	298,000
(*c*) Catch from 2 ton boats at 313 cwt.	156,500	234,750	250,400	250,400	250,400	250,400	250,400	250,400	250,400	266,050
Cumulated	156,500	391,250	641,650	892,050	1,142,450	1,392,850	1,643,250	1,893,650	2,144,050	2,410,100
Cumulated catch from all new boats	156,500	391,250	641,650	892,050	1,172,250	1,452,450	1,766,115	2,085,445	2,404,400	2,744,750

All catch figures are from the Japanese Report. It is believed that the yield, especially from the 2 ton boat class is a considerable underestimate.

	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968
Cost										
(*a*) Annual cost of 7.5 ton boats at Rs. 40,000 each (Rs. '000)	—	—	—	—	—	—	200	400	600	800
Cumulated (Rs. '000)	—	—	—	—	—	—	200	600	1,200	2,000
(*b*) Annual cost of 4 ton boats at Rs. 20,000 each (Rs. '000)	—	—	—	—	1,000	1,000	2,000	2,000	2,000	2,000
Cumulated (Rs. '000)	—	—	—	—	1,000	2,000	4,000	6,000	8,000	10,000
(*c*) Annual cost of 2 ton boats at Rs. 11,000 each (Rs. '000)	5,500	8,250	8,800	8,800	8,800	8,800	8,800	8,800	8,800	9,350
Cumulated (Rs. '000)	5,500	13,750	22,550	31,350	40,150	48,950	57,750	66,550	75,350	84,700

TABLE VIII

Annual Estimated Production (*cwt.*) excluding New Mechanized Boats

	1959	*1960*	*1961*	*1962*	*1963*	*1964*	*1965*	*1966*	*1967*	*1968*
Catch from :										
(1) 2 existing trawlers on Wadge Bank	31,320	31,320	31,320	31,320	31,320	31,320	31,320	31,320	31,320	31,320
(2) New trawlers on Wadge Bank	—	31,320	62,640	93,960	125,280	125,280	125,280	125,280	125,280	125,280
(3) New trawlers on Pedro Bank	—	—	62,640	109,620	109,620	109,620	109,620	109,620	109,620	109,620
(4) Existing Tuna boat	6,616	6,616	6,616	6,616	6,616	6,166	6,616	6,616	6,616	6,166
(5) New Tuna boats	15,624	31,248	78,120	78,120	156,240	156,240	156,240	156,240	156,240	156,240
(6) Mechanized Vallams	5,400	13,480	24,280	37,780	53,980	53,980	53,980	53,980	53,980	53,980
(7) Mechanized Orus	10,800	37,800	70,200	108,000	108,000	108,000	108,000	108,000	108,000	108,000
(8) Mechanized Kattumarams	2,250	6,750	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000
(9) Teppams using improved gear	122,663	0,185	157,709	157,709	157,709	157,709	157,709	157,709	157,709	157,709
(10) Unmechanized Vallams	75,114	72,684	69,444	65,394	60,534	60,534	60,534	60,534	60,534	60,534
(11) Unmechanized Orus	190,890	172,584	152,658	132,732	122,526	112,320	102,114	91,908	81,702	71,496
(12) Unmechanized Kattumarams using improved gear	71,370	68,670	61,920	61,920	61,920	61,920	61,920	61,920	61,920	61,920
(13) Beach Seine Fisheries	281,220	275,362	269,503	263,641	257,785	251,927	246,068	240,209	234,350	228,492
Total	813,267	888,019	1,065,050	1,164,815	1,239,530	1,253,466	1,237,401	1,221,336	1,205,271	1,189,207

TABLE IX

Summary of Annual Production (*cwts.*)

	1959	*1960*	*1961*	*1962*	*1963*	*1964*	*1965*	*1966*	*1967*	*1968*
Estimated Annual consumption (cwt.)	3,111,000	3,196,000	3,281,000	3,368,000	3,458,000	3,550,000	3,644,000	3,738,000	3,834,000	3,932,000
Catch from all craft other than new mechanized boats (cwt.)	813,267	888,019	1,065,050	1,164,815	1,287,530	1,253,466	1,237,401	1,221,336	1,205,271	1,189,207
Catch from new mechanized boats (cwt.)	156,500	391,250	641,650	892,050	1,172,250	1,452,450	1,766,115	2,083,445	2,404,440	2,744,750
Total catch (cwt.)	969,767	1,279,269	1,706,700	2,056,865	2,441,780	2,705,916	3,003,516	3,304,781	3,609,711	3,933,957
Degree of self-sufficiency (%)	31	40	52	61	71	76	82	88	94	100
Required Imports to meet total consumption (cwt.)	2,141,233	1,916,731	1,574,300	1,311,135	1,016,220	844,084	671,444	433,219	224,289	—

TABLE X

Calculation of Total Cost of New Boats and Mechanization of Existing Boats

(Rs. '000)

Craft	1959		1960		1961		1962		1963		1964		1965		1966		1967		1968		Total	
	No.	Cost	No.	Cost	No.	Cost	No.	Cost	No.	Cost	No.	Cost	No.	Cost	No.	Cost	No.	Cost	No.	Cost	No.	Cost
Trawlers—Wadge Bank	—		2	3,000	2	3,000	2	3,000	2	3,000	—	—	—	—	—	—	—	—	—	—	8	12,000
Tuna Boats	1	1,500	1	1,500	3	4,500	—	—	5	7,500	—	—	—	—	—	—	—	—	—	—	10	15,000
Trawlers—Pedro Bank	—	—	—	—	4	6,000	3	4,500	—	—	—	—	—	—	—	—	—	—	—	—	7	10,500
Mechanizing Vallams	50	400	75	600	100	800	125	1,000	150	1,200	—	—	—	—	—	—	—	—	—	—	500	4,000
Mechanizing Orus	100	150	250	375	300	450	350	525	—	—	—	—	—	—	—	—	—	—	—	—	1,000	1,500
Mechanizing Kattumarams	25	38	50	75	125	187	—	—	—	—	—	—	—	—	—	—	—	—	—	—	200	300
New 7·5 ton boats	—	—	—	—	—	—	—	—	—	—	—	—	5	200	10	400	15	600	20	800	50	2,000
New 4 ton boats	—	—	—	—	—	—	—	—	50	1,000	50	1,000	100	2,000	100	2,000	100	2,000	100	2,000	500	10,000
New 2 ton boats	500	5,500	750	8,250	800	8,800	800	8,800	800	8,800	800	8,800	800	8,800	800	8,800	800	8,800	850	9,350	7,700	84,700
		7,588		13,800		23,737		17,825		21,500		9,800		11,000		11,200		11,400		12,150		140,000

TABLE XI

Gross Cost to Government of Mechanizing Boats and Introducing New Boats

(Rs. '000)

Craft	1959		1960		1961		1962		1963		1964		1956		1966		1967		1968		Total	
	No.	Cost	No.	Cost	No.	Cost	No.	Cost	No.	Cost	No.	Cost	No.	Cost	No.	Cost	No.	Cost	No.	Cost	No.	Cost
Trawlers—Wadge Bank	—	—	2	3,000	2	3,000	2	3,000	2	3,000	—	—	—	—	—	—	—	—	—	—	8	12,000
Tuna Boats	—	—	1	1,500	3	4,500	—	—	5	7,500	—	—	—	—	—	—	—	—	—	—	9	13,500
Trawlers—Pedro Bank	—	—	—	—	4	6,000	3	4,500	—	—	—	—	—	—	—	—	—	—	—	—	7	10,500
Mechanizing Vallams	50	400	75	600	100	800	125	1,000	150	1,200	—	—	—	—	—	—	—	—	—	—	500	4,000
Mechanizing Orus	100	150	250	375	300	450	330	525	—	—	—	—	—	—	—	—	—	—	—	—	1,000	1,500
Mechanizing Kattumarams	25	38	50	75	125	187	—	—	—	—	—	—	—	—	—	—	—	—	—	—	200	300
New 7·5 ton boats	—	—	—	—	—	—	—	—	—	—	—	—	5	200	10	400	15	600	20	800	50	2,000
New 4 ton boats	—	—	—	—	—	—	—	—	50	1,000	50	1,000	100	2,000	100	2,000	100	2,000	100	2,000	500	10,700
New 2 ton boats	500	5,500	750	8,250	800	8,800	800	8,800	800	8,800	800	8,800	800	8,800	800	8,800	800	8,800	850	9,350	7,700	84,700
		6,088		13,800		23,737		17,828		21,500		9,800		11,000		11,200		11,400		12,150		138,500

Note.—Except for a single Tuna Boat which is likely to be purchased by a limited liability Company, all other Trawlers and Tuna Boats will in all probability have to be purchased and operated either by the Department of Fisheries or a Government Corporation. Hence all costs, except for a single Tuna Boat will be a charge on the Government. In the matter of all other categories the scheme is for the Government to give operators an interest free loan to purchase either the new craft and associated gear, or for the purchase of an appropriate engine to mechanize their boats with. Hence the cost of purchase or mechanization will be a charge on Government in the year of purchase. The cost will, however, be recovered and these recoveries are shown in the succeeding table.

TABLE XII

Annual Recovery by Government of Loans issued for Purchase of Boats and Engines

Rs. '000

	1959	*1960*	*1961*	*1962*	*1963*	*1964*	*1965*	*1966*	*1967*	*1966*	*Total*
(*a*) *Orus*											
The entire loan of Rs. 1,500 for the engine will be recovered in the year following that of the purchase ..	—	150	375	450	525	—	—	—	—	—	1,500
(*b*) *Kattumarams*											
Same as the scheme for Orus ..	—	38	75	187	—	—	—	—	—	—	300
(*c*) *Vallams*											
The cost of Rs. 8,000 for the engine is to be recovered in 4 instalments in the following proportions:—30: 30: 25 : 15, i.e., Rs. 2,400: Rs. 2,400/200/1,200 Payment to commence in the year succeeding to that of purchase	—	120	180	240	300	360	—	—	—	—	
			120	180	240	300	360	—	—	—	
				100	150	200	250	300	—	—	
					060	090	120	150	180	—	
Total	—	120	300	520	750	950	730	450	180	—	4,000
(*d*) New boats 7.5 ton class. The cost of Rs. 40,000 will be recovered in 5 instalments in the following proportions :— 30 : 25 : 20 : 15 : 10 i.e. Rs. 12,000 ; 10,000 ; 8,000 ; 6,000 ; 4,000. The first instalment being due in the year following that of purchase	—	—	—	—	—	—	—	60	120	180	
									50	100	
										40	
Total	—	—	—	—	—	—	—	60	170	320	550

TABLE XII—(*Contd*)

Annual Recovery by Government of Loans issued for Purchase of Boats and Engines—(*Contd*)

Rs. '000

	1959	*1960*	*1961*	*1962*	*1963*	*1964*	*1965*	*1966*	*1967*	*1968*	*Total*
(*e*) New boats 4 ton class. Same ratios as above. The recovery of the Rs. 20,000 will thus be on the following instalments:—6,000; 5,000; 4,000; 3,000; 2,000	—	—	—	—	—	300	300	600	600	600	
							250	250	500	500	
								200	200	400	
									150	150	
Total ..	—	—	—	—	—	300	550	1,050	1,450	1,650	5,000
(*f*) New boats 2 ton. Same ratios: Payment would be on the cost of Rs.11,000 be 3,300 : 2,750 ; 2,200 ; 1,650 ; 1,100		1,650	2,475	2,640	2,640	2,640	2,640	2,640	2,640	2,640	
	—		1,375	2,063	2,200	2,200	2,200	2,200	2,200	2,200	
				1,100	1.650	1,760	1,760	1,760	1,760	1,760	
					0,825	1,238	1,320	1,320	1,320	1,320	
						550	824	770	880	880	
Total ..	—	1,650	3,850	5,803	7,315	8,388	8,745	8,800	8,800	8,800	62,151

Note.—Repayment ratios have been fixed to take account of the fact that in the first years repairs and replacements are negligible and the capacity to repay is thereby greater.

Summary Table of Government Recoveries

	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	Total
Craft : Orus	—	150	375	450	525	—	—	—	—	—	1,500
Kattumarams	—	38	75	187	—	—	—	—	—	—	300
Vallams	—	120	300	420	750	950	730	450	180	—	4,000
7.5 ton boats	—	—	—	—	—	—	—	60	170	320	550
4 ton boats	—	—	—	—	—	300	550	1,050	1,450	1,750	5,000
2 ton boats	—	1,650	3.850	5,803	7,315	8,388	8,745	8,800	8,800	8,800	62,151
Total ..	—	1,958	4,600	6,960	8,590	9,638	10,025	10,360	10,600	10,770	73,501

Net cost to Government over 10-year period .. 64,999

TABLE XIII

Capital Cost of Gear required for New Boats and Other Craft

(Rs. '000)

Type of boat	*Cost of gear for each unit*	*1959*	*1960*	*1961*	*1962*	*1963*	*1964*	*1965*	*1966*	*1967*	*1968*	*Total*
Trawler	60	—	120	120	120	120	—	—	—	—	—	480
Tuna boat	60	60	60	180	—	300	—	—	—	—	—	600
Trawlers for Pedro	60	—	—	240	180	—	—	—	—	—	—	420
Mechanised Orus	1.5	150	375	450	525	—	—	—	—	—	—	1,500
Mechanised Vallams	3	150	225	300	375	450	—	—	—	—	—	1,500
Mechanised Kattumarams	3	75	150	375	—	—	—	—	—	—	—	600
Unmechanised Orus	—	—	—	—	—	—	—	—	—	—	—	—
Unmechanised Vallams	—	—	—	—	—	—	—	—	—	—	—	—
Unmechanised Kattumarams in actual use	3	688	688	688								2,063
Teppams in actual use (Rs. 150 per net)	.9	710	710	710	—	—	—	—	—	—	—	2,131
New mechanised coastal fishing boats												
7·5 tons	6	—	—	—	—	—	—	30	60	90	120	300
4 tons	4.5	—	—	—	—	225	225	450	450	450	450	2,250
2 tons	3.0	1,500	2,250	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,550	23,100
Total		3,333	4,578	5,463	3,600	3,495	2,625	2,880	2,940	2,120	3,120	34,944
											Total ..	34,944

Notes.—These cost figures refer only to the gear that must be purchased initially for each type of craft.

They exclude all replacements of gear necessitated through use. All figures from Director of Fisheries.

The scheme for Kattumarams is that each Kattumaram should utilise 12 pieces of nylon net. It is anticipated that the full scheme would be spread over 3 years. In the case of teppams the full complement of nets is 6 and in this case too the scheme would take 3 yeasr to implement fully.

TABLE XIV

Gross Cost to Government for Gear supply to New Boats and other Craft

(Rs. '000)

Type of boat	*Cost of gear for each boat*	*1959*	*1960*	*1961*	*1962*	*1963*	*1964*	*1965*	*1966*	*1967*	*1968*	*Total*
Trawler	60	—	120	120	120	120	—	—	—	—	—	480
Tuna Boat	60	—	60	180	—	300	—	—	—	—	—	540
Trawlers for Pedro	60	—	—	240	180	—	—	—	—	—	—	420
Mechanised Orus	1.5	150	375	450	525	—	—	—	—	—	—	1,500
Mechanised Vallams	3	150	225	300	375	450	—	—	—	—	1	1,500
Mechanised Kattumarams	3	75	150	375	—	—	—	—	—	—	—	600
Unmechanised Orus	—											
Unmechanised Vallams	—											
Unmechanised Kattumarams in actual use	3	687.6	687.6	687.6	—	—	—	—	—	—	—	2,063
Teppams in actual use (Rs. 150 per net)	·9	710.4	710.4	710.4	—	—	—	—	—	—	—	2,131
New mechanized coastal fishing boats												
7·5 tons	6	—	—	—	—	—	—	30	60	90	120	300
4 tons	4.5	—	—	—	—	25	225	450	450	450	450	2,250
2 tons	3.0	1,500	2,250	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,550	23,100
Total		3,273	4,578	5,463	3,600	3,495	2,625	2,880	2,910	2,940	3,120	34,884

Total .. Rs. 34,884

Note.—The scheme is for the Government to issue all the gear required for the effective utilization of the craft. The cost figures shown are the gross costs that are incurred each year by the Government. All the gear for the trawlers and tuna boats, except for one tuna boat which is to be privately owned, will be obtained by either a Government Corporation or the Department of Fisheries, and hence the cost of the gear for these will be a full charge on the Government. In the case of all other craft, the value of the gear will be recovered in two instalments orof 50 per cent. each. The recoveries on this account are shown in the succeeding table.

TABLE XV

Recovery by Government on Loans for Fishing Gear

Rs. '000

	1959	*1960*	*1961*	*1962*	*1963*	*1964*	*1965*	*1966*	*1967*	*1968*
Mechanized Orus	—	75·0	75·0	—	—	—	—	—	—	—
	—	—	187·5	187·5	—	—	—	—	—	—
	—	—	—	225.0	225·0	—	—	—	—	—
	—	—	—	—	262·5	262·5	—	—	—	—
	—	75·0	262·5	412·5	487·5	262·5	—	—	—	—
Mechanized Vallams	—	75·0	75·0	—	—	—	—	—	—	—
	—	—	112·5	112·5	—	—	—	—	—	—
	—	—	—	150·0	150·0	—	—	—	—	—
	—	—	—	—	187·5	187·5	—	—	—	—
	—	—	—	—	—	225·0	225·0	—	—	—
	—	75·0	187·5	262·5	337·5	412·5	225·0	—	—	—
Mechanized Kattumarams	—	37·5	37·5	—	—	—	—	—	—	—
	—	—	75·0	—	—	—	—	—	—	—
	—	—	—	75·0	—	—	—	—	—	—
	—	—	—	187·5	187·5	—	—	—	—	—
	—	37·5	112·5	262·5	187·5	—	—	—	—	—
Unmechanized Kattumarams	—	343·8	343·8	—	—	—	—	—	—	—
	—	—	343·8	343·8	—	—	—	—	—	—
	—	—	—	343·8	343·8	—	—	—	—	—
	—	343·8	687·6	687·6	343·8	—	—	—	—	—

TABLE XV—(*contd.*)

Recovery by Government on Loans for Fishing Gear—(*contd.*)

(*Rs. '000*)

	1959	*1960*	*1961*	*1962*	*1963*	*1964*	*1965*	*1966*	*1967*	*1968*
Teppams	—	355·2	355·2	—	—	—	—	—	—	—
	—	—	355·2	355·2	—	—	—	—	—	—
	—	—	—	355·2	355·2	—	—	—	—	—
	—	355·2	710·4	710·4	355·2	—	—	—	—	—
New Mechanized Coastal Fishing Boats										
7·5 ton class	—	—	—	—	—	—	—	15·0	15·0	—
	—	—	—	—	—	—	—	—	30·0	30·0
	—	—	—	—	—	—	—	—	—	45·0
	—	—	—	—	—	—	—	15·0	45·0	75·0
4 ton class	—	—	—	—	—	112·5	112·5	—	—	—
	—	—	—	—	—	—	112·5	112·5	—	—
	—	—	—	—	—	—	—	225·0	225·0	—
	—	—	—	—	—	—	—	—	225·0	225·0
	—	—	—	—	—	—	—	—	—	225·0
	—	—	—	—	—	112·5	225·0	337·5	450·0	450·0
2 ton class	—	750·0	750·0	—	—	—	—	—	—	—
	—	—	1,125·0	1,125·0	—	—	—	—	—	—
	—	—	—	1,200·0	1,200·0	—	—	—	—	—
	—	—	—	—	1,200·0	1,200·0	—	—	—	—
	—	—	—	—	—	1,200·0	1,200·0	—	—	—
	—	—	—	—	—	—	1,200·0	1,200·0	—	—
	—	—	—	—	—	—	—	1,200·0	1,200·0	—
	—	—	—	—	—	—	—	—	1,200·0	1,200·0
	—	—	—	—	—	—	—	—	—	1,200·0
	—	750·0	1,875·0	2,325·0	2,400·0	2,400·0	2,400·0	2,400·0	2,400·0	2,400·0

Note.—All loans for fishing gear will be recovered in two years in equal instalments commencing from the year following that in which the loan was given.

TABLE XVI

Summary of Government Recovery of Loans for Fishing Gear

(Rs. '000)

Craft	*1959*	*1960*	*1961*	*1962*	*1963*	*1964*	*1965*	*1966*	*1967*	*1968*	*Total*
Mechanized Orus	—	75	263	412	488	262	—	—	—	—	1,500
Mechanized Vallams	—	75	188	262	338	412	225	—	—	—	1,500
Mechanized Kattumarams	—	38	112	262	188	—	—	—	—	—	600
Unmechanized Kattumarams	—	344	688	688	344	—	—	—	—	—	2,063
Teppams	—	355	710	710	355	—	—	—	—	—	2,131
New Mechanized Coastal Boats											
7.5 tons	—	—	—	—	—	—	—	15	45	75	135
4 tons	—	—	—	—	—	113	225	338	450	450	1,576
2 tons	—	750	1,875	2,325	2,400	2,400	2,400	2,400	2,400	2,400	19,350
	—	1,637	3,836	4,659	4,113	3,187	2,850	2,753	2,895	2,925	28,855

TABLE XVII

Number of Craft

Type of Craft	*1959*	*1960*	*1961*	*1962*	*1963*	*1964*	*1965*	*1966*	*1967*	*1968*
(*a*) Trawlers	2	4	6	8	10	10	10	10	10	10
(*b*) Tuna Boats	2	3	6	6	11	11	11	11	11	11
(*c*) Trawlers for Pedro			4	7	7	7	7	7	7	7
(*d*) Mechanized Vallams	50	125	225	350	500	500	500	500	500	500
(*e*) Mechanized Orus	100	350	650	1,000	1,000	1,000	1,000	1,000	1,000	1,000
(*f*) Mechanized Kattumarams	25	75	200	200	200	200	200	200	200	200
(*g*) Teppams	2,368	2,368	2,368	2,368	2,368	2,368	2,368	2,368	2,368	2,368
(*h*) Unmechanized Orus	5,891	5,326	4,711	4,096	3,781	3,466	3,151	2,836	2,521	2,206
(*i*) Unmechanized Vallams	2,319	2,244	2,144	2,019	1,869	1,869	1,869	1,869	1,869	1,869
(*j*) Kattumarams	1,321	1,271	1,146	1,146	1,146	1,146	1,146	1,146	1,146	1,146
(*k*) New boats 7.5 tons	—	—	—	—	—	—	5	15	30	50
(*l*) New boats 4 tons	—	—	—	—	50	100	200	300	400	500
(*m*) New boats 2 tons	500	1,250	2,050	2,850	3,650	4,450	5,250	6,050	6,850	7,700
Total	12,578	13,016	13,510	14,050	14,592	15,127	15,717	16,312	16,912	17,567

TABLE XVIII

Numbers directly Employed in Fishing 1959-60

Type of Craft	*No. required for each unit*	*1959*	*1960*	*1961*	*1962*	*1963*	*1964*	*1965*	*1966*	*1967*	*1968*
Trawlers	25	50	100	150	200	250	250	250	250	250	250
Tuna boats	25	50	75	150	150	275	275	275	275	275	275
Trawlers on Pedro	25	—	—	100	175	175	175	175	175	175	175
Mechanized Vallams	5	250	625	1,125	1,750	2,500	2,500	2,500	2,500	2,500	2,500
Mechanized Orus	5	500	1,750	3,250	5,000	5,000	5,000	5,000	5,000	5,000	5,000
Mechanized Kattumarams	3	75	225	600	600	600	600	600	600	600	600
Teppams	2	4,736	4,736	4,736	4,736	4,736	4,736	4,736	4,736	4,736	4,736
Unmechanized Orus	5	29,455	26,630	23,555	20,480	18,905	17,330	15,755	14,180	12,605	11,030
Unmechanized Vallams	5	11,595	11,220	10,720	10,095	9,345	9,345	9,345	9,345	9,345	9,345
Unmechanized Kattumarams	3	3,963	3,813	3,438	3,438	3,438	3,438	3,438	3,438	3,438	3,438
New 7·5 ton boats	6	—	—	—	—	—	—	30	90	180	300
New 4 ton boats	5	—	—	—	—	250	500	1,000	1,500	2,000	2,500
New 2 ton boats	4	2,000	5,000	8,200	11,400	14,600	17,800	21,000	24,200	27,400	30,800
Sub-total		52,674	54,174	56,024	58,024	60,074	61,949	64,104	66,289	68,504	70,949
Beach Seine Fisheries* (As catch from this is assumed to dwindle by 2 per cent. annually, numbers employed are also reduced by 2 per cent.)		25,723	25,209	24,705	24,211	23,727	23,252	22,787	22,331	21,884	21,446
Total		78,397	79,383	80,729	82,235	83,801	85,201	86,891	88,620	90,388	92,395

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* The number employed in beach seine fisheries was derived as a residual. In 1957, 79,008 people were directly employed in fisheries ; of these 52,224 were calculated to be employed on craft on application of numbers required to man each craft to the number of craft in 1958. The balance 26,784 were therefore taken to be employed on beach seine fisheries.

Increase between 1959 and 1968 = 13,998.

TABLE XIX

Foreign Costs of Mechanization and of New Boats

(Rs. '000)

Craft	*Foreign Cost Per Unit*	*1959*	*1960*	*1961*	*1962*	*1963*	*1964*	*1965*	*1966*	*1967*	*1968*	*Total*
Trawlers for Wadge Bank	1,500,000	—	3,000	3,000	3,000	3,000	—	—	—	—	—	12,000
Trawlers for Pedro Bank	1,500,000	—	—	6,000	4,500	—	—	—	—	—	—	10,500
Tuna Boats	1,500,000	1,500	1,500	4,500	—	7,500	—	—	—	—	—	15,000
Mechanized Vallams	7,500	375	563	750	937	1,125	—	—	—	—	—	3,750
Mechanized Orus	1,500	150	375	450	525	—	—	—	—	—	—	1,500
Mechanized Kattumarams	1,500	38	75	187	—	—	—	—	—	—	—	300
New Boats												
(a) 7·5 tons	16,000	—	—	—	—	—	—	80	160	240	320	800
(b) 4 tons	9,000	—	—	—	—	450	450	900	900	900	900	4,500
(c) 2 tons	5,500	2,750	4,125	4,400	4,400	4,400	4,400	4,400	4,400	4,400	4,675	42,350
Total		4,813	9,638	19,287	13,362	16,475	4,850	5,380	5,460	5,540	5,895	90,700

TABLE XX

Foreign Cost of Gear required for New Boats and Other Craft

(Rs.'000)

Type of Boat	*Cost of Gear for each Unit*	*1959*	*1960*	*1961*	*1962*	*1963*	*1964*	*1965*	*1966*	*1967*	*1968*
Trawler	60	—	120	120	120	120	—	—	—	—	—
Tuna Boats	60	60	60	18	—	300	—	—	—	—	—
Trawlers for Pedro	60	—	—	240	180	—	—	—	—	—	—
Mechanized Orus	1·5	150	375	450	525	—	—	—	—	—	—
Mechanized Vallams	3	150	225	300	375	450	—	—	—	—	—
Mechanized Kattumarams	3	75	150	375	—	—	—	—	—	—	—
Unmechanized Orus	—										
Unmechanized Vallams	—										
Unmechanized Kattumarams	3	688	688	688	—	—	—	—	—	—	—

New Unmechanized Coastal fishing boats											
7·5 tons	6	—	—	—	—	—	—	30	60	90	120
4 tons	4·5	—	—	—	—	225	225	450	450	450	450
2 tons	3	1,500	2,250	2,400	2,400	2,400	2,400	2,400	2,550	2,550	2,550
Teppams	·9 (Rs. 150 per net)	710	710	710	—	—	—	—	—	—	—
		3,333	4,578	5,301	3,600	3,495	2,625	2,880	3,060	3,090	3,120
										Total ..	35,082

Note.—All gear has to be imported and therefore the capital cost is the same as foreign costs.

Summary

Total Foreign Cost

Rs. '000)

	1959	*1960*	*1961*	*1962*	*1963*	*1964*	*1965*	*1966*	*1967*	*1968*	
Foreign cost of mechanized and of new boats	4,813	9,638	19,287	13,362	16,475	4,850	5,380	5,460	5,540	5,895	
Foreign cost of gear required for new boats and other craft	3,333	4,578	5,301	3,600	3,495	2,625	2,880	3,060	3,090	3,120	
	8,146	14,216	24,588	16,962	19,970	7,475	8,260	8,520	8,630	9,015	
										Total ..	125,782

TABLE XXI

Recurring Foreign Costs incurred in Operating Craft

The following items constitute the recurring annual foreign costs incurred in operating the various types of craft.

Item	*Trawlers*	*Tuna boats*	*Mech. Orus*	*Mech. Vallams*	*Mech. Kattumarams*	*7·5 ton boats*	*4 ton boats*	*2 ton boats*	*Unmechanised Kattumarams*
Fuel	140,000	150,000	500	3,000	500	6,000	4,500	3,000	—
Replacements	40,000	40,000	250	375	250	800	450	275	—
Stores and equipment (including gear)	60,000	60,000	500	1,000	1,000	2,000	1,500	1,000	1,000
Depreciation	75,000	75,000	750	938	750	2,000	1,125	688	—
Total	325,000	325,000	2,000	5,313	2,500	10,800	7,575	4,963	1,000

Notes.—Fuel : All figures are from Director of Fisheries.

Replacements: 5 per cent. of the original cost of the engine is assumed to be spent on replacements.

Stores and equipment : This item includes gear. 1/3rd of the original cost is assumed to be spent each year on gear replacement.

Depreciation : This refers mainly to engines. The life of an engine, except in the case of an Oru or Kattumaram where it is estimated to be 2 years, is taken to be 8 years, i.e., 1/8th of the original cost of the engine has to be set aside for replacements.

Trawlers and Tuna boats : The figures for trawlers are those actually incurred now. Tuna boats are expected to incur the same cost.

(*Rs. '000*)

Craft	*1959*	*1960*	*1961*	*1962*	*1963*	*1964*	*1965*	*1966*	*1967*	*1968*
Trawlers for Wadge Bank	650	1,300	1,950	2,600	3,250	3,250	3,250	3,250	3,250	3,250
Trawlers for Pedro Bank	—	—	1,300	2,275	2,275	2,275	2,275	2,275	2,275	2,275
Tuna Boats	650	975	1,950	1,950	3,575	3,575	3,575	3,575	3,575	3,575
Mechanized Orus	200	700	1,300	2,000	2,000	2,000	2,000	2,000	2,000	2,000
Mechanised Vallams	266	664	1,195	1,859	2,656	2,656	2,656	2,656	2,656	2,656
Mechanized Kattumarams	62	187	500	500	500	500	500	500	500	500
7·5 ton boats	—	—	—	—	—	—	54	162	324	540
4 ton boats	—	—	—	—	379	758	1,515	2,273	3,030	3,788
2 ton boats	2,481	6,204	10,174	14,144	18,115	22,085	26,056	30,026	33,997	38,215
Unmechanized Kattumarams	1,146	1,146	1,146	1,146	1,146	1,146	1,146	1,146	1,146	1,146
Total	5,455	11,176	19,515	26,475	33,896	38,245	43,027	47,863	52,753	57,945

List of Obstructions

1. Removal of rocks at the entrance to Ahungalla harbour.
2. Removal of rocks—Makanda harbour, Wellaboda, Balapitiya.
3. Removal of submarine rocks at the entrance to the Nambimulla, Patabendimulla, Totupola, Ambalangoda.
4. Enlargement of gap in the reef—Unawatuna Fishery harbour.
5. Enlargement of gap in the reef—Miriwaraya, Mirissa.
6. Blasting of rocks and enlargement of gap in the reef—Totamuna, Matara.
7. Enlargement of gap in the reef—Puranawella, Dondra.
8. Removal of coral from the reef—Kottegoda.
9. Removal of coral from the reef—Gandara.
10. Removal of rocks—Nilwella Waraya, Dickwella.
11. Removal of coral reef—Medeltotupola, Tangalla.
12. Removal of coral reef—Dodanduwa.
13. Removal of rock—Kotadelpola Waraya, Tangalla.
14. Removal of two rocks in Unakuruwa Bay and the removal of some rock and coral reef—Goyanbokke near Tangalla.
15. Removal of rock obstructing fishing at Uraniyawaraya.
16. Widening of the gap of the Oruwella reef.
17. Removal of rock at Noonawella.
18. Removal of coral reef—Maduwa, Diggalla, Tambiliyawa, Kalutara South.
19. Removal of rock at Amaduwa.
20. Removal of rocks and widening gap in the reef—Akurella, Walkata, Ambalangoda.
21. Enlargement of reef gaps at Dehiwala.
22. Reef opposite Dehiwala Railway Station—2nd exit in the reef.
23. Widening the gap in the reef—Kalametiya.
24. Removal of rocks between Velvettiturai and Point Pedro.

TABLE XXII (*contd.*

List of Obstructions (*contd.*)

25. Removal of rocks from the fishing padus at Kalappadu.
26. Removal of rocks—Weligama.
27. Removal of reef—Bandarawatte.
28. Removal of reef—Kahawe Waraya.
29. Digging of the channel in the sea at Talaimannar.
30. Removal of rocks at Kapparatota.
31. Fishery harbour—Malawatana, Ambalangoda.
32. Enlargement of the gap—Godakodalla.
33. Removal of rocks at Pattangalla.
34. Provision of 5 breaches in the reef opposite Point Pedro for safe passage of Kattumarams.
35. Widening of the gap in the reef—Polhena.
36. Removal of rocks—Poonachimunai in Manchantoduwa—Batticaloa.
37. Removal of rock—Totamune, Matara.
38. Disabled aeroplane in fishing Bay, Paiyagala South.
39. Damage to sea fishing nets by submerged rocks at Pelena in Weligama Korale.
40. Construction of Fishery harbour at Mullaitivu or Nayaru.
41. Negombo Lagoon—Dredging, &c.
42. Removal of rocks at Dungalpitiya, Negombo.
43. Removal of rocks at Wellaboda.
44. Removal of rocks at Kudawelika Waraya and Waturegama Waraya, Ahungalla.

TABLE XXIII

Total Cost of Ancilliary Facilities

(Rs. '000)

Item	*1959*	*1960*	*1961*	*1962*	*1963*	*1964*	*1965*	*1966*	*1967*	*1968*	*Total*
All harbours	1,000	13,374	13,374	13,374	13,374	13,374	13,374	13,374	13,374	13,374	121,366
***Repair facilities* :**											
(a) (1) Workshop in Colombo costing Rs. 1 million	100	900	—	—	—	—	—	—	—	—	1,000
(2) Small workshops in Galle and Trincomalee of Rs. 250,000 each	50	450	—	—	—	—	—	—	—	—	500
Freezing Cold Storage and Ice Production	2,814	2,193	3,115	3,207	3,567	3,894	4,385	4,778	5,203	—	33,156
***Transport facilities* :**											
Insulated freighter	320	320	320	320	320	320	320	320	320	320	3,200
Insulated containers	5	5	5	5	5	5	5	5	5	5	50
Lorry	627	627	627	627	627	627	627	627	627	627	6,270
***Marketing facilities* :**											
(a) Facilities	227	227	227	227	227	227	227	227	227	227	2,270
(b) Depot	30	30	30	30	30	30	30	30	30	30	300
	5,173	18,126	17,698	17,790	18,150	18,477	18,968	19,361	19,786	14,583	168,112

Note.—All cost figures are from the Japanese Report. Rs. 1 million has been added to the cost of harbours as being the cost of designing the Fisheries harbour. The annual phasing of the cost of providing facilities for freezing, &c., has been derived by allocating the cost of these items for the appropriate year in the same ratios as the catch in that year bears to total catch over the ten-year period. The resulting annual cost figure has then been advanced by a year as these facilities should be in existence if the estimated output for that year is to be treated and handled. The cost of insulated freighters have been included here although this should really figure in the plan for railway development.

TABLE XXIV

Total Cost of the Plan for Fisheries

(Rs. '000)

	Item	*1959*	*1960*	*1961*	*1962*	*1963*	*1964*	*1965*	*1966*	*1967*	*1968*	*Total*
1.	The cost of mechanizing Vallams	400	600	800	1,000	1,200	—	—	—	—	—	4,000
2.	Mechanizing Orus	150	375	450	525	—	—	—	—	—	—	1,500
3.	Mechanizing Kattumarams	38	75	187	—	—	—	—	—	—	—	300
4.	Gear for Teppams	710	710	710	—	—	—	—	—	—	—	2,131
5.	Gear for unmechanized Kattumarams	688	688	688	—	—	—	—	—	—	—	2,063
6.	Trawlers for Pedro Bank	—	—	6,000	4,500	—	—	—	—	—	—	10,500
7.	Trawlers for Wadge Bank	—	3,000	3,000	3,000	3,000	—	—	—	—	—	12,000
8.	Pelagic Tuna Boats	1,500	1,500	4,500	—	7,500	—	—	—	—	—	15,000
9.	New 7·5 Ton Boats	—	—	—	—	—	—	200	400	600	800	2,000
10.	New 4 Ton Boats	—	—	—	—	1,000	1,000	2,000	2,000	2,000	2,000	10,000
11.	New 2 Ton Boats	5,500	8,250	8,800	8,800	8,800	8,800	8,800	8,800	8,800	9,350	84,700
12.	Gear for new Trawlers on Wadge Bank	—	120	120	120	120	—	—	—	—	—	480
13.	Gear for Tuna Boats	60	60	180	—	300	—	—	—	—	—	600
14.	Gear for Pedro Bank Trawlers	—	—	240	180	—	—	—	—	—	—	420
15.	Gear for Mechanized Orus	150	375	450	525	—	—	—	—	—	—	1,500
16.	Gear for Mechanized Vallams	150	225	300	375	450	—	—	—	—	—	1,500
17.	Gear for Mechanzied Kattumarams	75	150	375	—	—	—	—	—	—	—	600
18.	Gear for new 7·5 Ton Boats	—	—	—	—	—	—	30	60	90	120	300
19.	Gear for new 4 Ton Boats	—	—	—	—	225	225	450	450	450	450	2,250
20.	Gear for new 2 Ton Boats	1,500	2,250	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,550	23,100
21.	Harbours	1,000	13,374	13,374	13,374	13,374	13,374	13,374	13,374	13,374	13,374	121,366

22. Repair Workshop in Colombo	100	900	—	—	—	—	—	—	—	—	1,000
23. Workshops in Galle and Trincomalee	50	450	—	—	—	—	—	—	—	—	500
24. Boat Yards	750	750	—	—	—	—	—	—	—	—	1,500
25. Freezing, Cold Storage and Ice Production Plants	2,814	2,193	3,115	3,207	3,567	3,894	4,385	4,778	5,203	—	33,156
26. Insulated freighters	320	320	320	320	320	320	320	320	320	320	3,200
27. Insulated containers	5	5	5	5	5	5	5	5	5	5	50
28. Lorry Transport	627	627	627	627	627	627	627	627	627	627	6,270
29. Marketing Facilities	227	227	227	227	227	227	227	227	227	227	2,270
30. Depots for Marketing	30	30	30	30	30	30	30	30	30	30	300
31. Research Vessels	—	200	—	—	—	200	—	—	—	—	400
32. Inland Fisheries	350	350	350	350	350	350	350	350	350	350	3,500
33. Marine Aquarium	—	500	—	—	—	—	—	—	—	—	500
34. Field Laboratories	—	100	—	—	—	100	—	—	—	—	200
Total	17,194	38,404	47,248	39,565	43,495	31,552	33,198	33,821	34,476	30,203	349,156

Note.—Due to rounding-off the sum of the individual items may differ slightly from the total.

TABLE XXV

Gross Cost to Government of Fisheries Programme

(Rs. '000)

Item	*1959*	*1960*	*1961*	*1962*	*1963*	*1964*	*1965*	*1966*	*1967*	*1968*	*Total*
1. The cost of mechanizing Vallams	400	600	800	1,000	1,200	—	—	—	—	—	4,000
2. Mechanizing Orus	150	375	450	525	—	—	—	—	—	—	1,500
3. Mechanising Kattumarams	38	75	187	—	—	—	—	—	—	—	300
4. Gear for Teppams	710	710	710	—	—	—	—	—	—	—	2,131
5. Gear for unmechanized Kattumarams	688	688	688	—	—	—	—	—	—	—	2,064
6. Trawlers for Pedro Bank	—	—	6,000	4,500	—	—	—	—	—	—	10,500
7. Trawlers for Wadge Bank	—	3,000	3,000	3,000	3,000	—	—	—	—	—	12,000
8. Pelagic Tuna Boats	—	1,500	4,500	—	7,500	—	—	—	—	—	13,500
9. New 7·5 Ton Boats	—	—	—	—	—	—	200	400	600	800	2,000
10. New 4 Ton Boats	—	—	—	—	1,000	1,000	2,000	2,000	2,000	2,000	10,000
11. New 2 Ton Boats	5,500	8,250	8,800	8,800	8,800	8,800	8,800	8,800	8,800	9,350	84,700
12. Gear for new Trawlers on Wadge Bank	—	120	120	120	120	—	—	—	—	—	480
13. Gear for Tuna Boats	—	60	180	—	300	—	—	—	—	—	540
14. Gear for Pedro Bank Trawlers	—	—	240	180	—	—	—	—	—	—	420
15. Gear for Mechanized Orus	150	375	450	525	—	—	—	—	—	—	1,500
16. Gear for Mechanized Vallams	150	225	300	375	450	—	—	—	—	—	1,500
17. Gear for Mechanized Kattumarams	75	150	375	—	—	—	—	—	—	—	600
18. Gear for New 7·5 Ton Boats	—	—	—	—	—	—	30	60	90	120	300
19. Gear for New 4 Ton Boats	—	—	—	—	225	225	450	450	450	450	2,250
20. Gear for New 2 Ton Boats	1,500	2,250	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,550	23,100
21. Harbours	1,000	13,374	14,374	13,374	13,374	13,374	13,374	13,374	13,374	13,374	121,366

22.	Repair Workshop in Colombo	100	900	—	—	—	—	—	—	—	—	1,000
23.	Workshops in Galle and Trincomalee	50	450	—	—	—	—	—	—	—	—	500
24.	Freezing, Cold Storage and Ice Production Plants	2,814	2,193	3,115	3,207	3,567	3,894	4,385	4,778	5,203	—	33,156
25.	Insulated freighters	320	320	320	320	320	320	320	320	320	320	3,200
26.	Insulated containers	5	5	5	5	5	5	5	5	5	5	50
27.	Marketing facilities	227	227	227	227	227	227	227	227	227	227	2,270
28.	Depots for Marketing	30	30	30	30	30	30	30	30	30	30	300
29.	Research Vessels	—	200	—	—	—	200	—	—	—	—	400
30.	Inland Fisheries	350	350	350	350	350	350	350	350	350	350	3,500
31.	Marine Aquarium	—	500	—	—	—	—	—	—	—	—	500
32.	Field Laboratories	—	100	—	—	—	100	—	—	—	—	200
	Total	14,257	37,027	46,621	38,938	42,868	30,925	32,571	33,194	33,849	29,576	339,829

Note.—Due to rounding-off the sum of the individual items may differ slightly from the total.

TABLE XXVI

Recovery by Government of Loans

(Rs. '000)

	Item	*1959*	*1960*	*1961*	*1962*	*1963*	*1964*	*1965*	*1966*	*1967*	*1968*	*Total*
1.	Mechanization of Orus	—	150	375	450	525	—	—	—	—	—	1,500
2.	Mechanization of Vallams	—	120	300	520	750	950	730	450	180	—	4,000
3.	Mechanization of Kattumarams	—	38	75	187	—	—	—	—	—	—	300
4.	New 7·5 ton boats	—	—	—	—	—	—	—	60	170	320	550
5.	New 4 ton boats	—	—	—	—	—	300	550	1,050	1,450	1,750	5,100
6.	New 2 ton boats	—	1,650	3,850	5,803	7,315	8,388	8,745	8,800	8,800	8,800	62,151
7.	Gear for Orus	—	75	263	412	488	262	—	—	—	—	1,500
8.	Gear for Vallams	—	75	188	262	338	412	225	—	—	—	1,500
9.	Gear for Kattumarams (mechanized)	—	38	112	262	188	—	—	—	—	—	600
10.	Gear for Kattumarams (unmechanized)	—	344	688	688	344	—	—	—	—	—	2,063
11.	Gear for Teppams	—	355	710	710	355	—	—	—	—	—	2,131
12.	Gear for new 7·5 ton boats	—	—	—	—	—	—	—	15	45	75	135
13.	Gear for new 4 ton boats	—	—	—	—	—	113	225	338	450	450	1,576
14.	Gear for new 2 ton boats	—	750	1,875	2,325	2,400	2,400	2,400	2,400	2,400	2,400	19,350
	Total	—	3,595	8,436	11,619	12,703	12,825	12,875	13,113	13,495	13,795	102,456

Net Expenditure by Government

	1959	*1960*	*1961*	*1962*	*1963*	*1964*	*1965*	*1966*	*1967*	*1968*	*Total*
ANNUAL EXPENDITURE	14,257	37,027	47,625	38,938	42,868	30,925	32,571	33,194	33,849	29,576	339,826
ANNUAL RECOVERY	—	3,595	8,436	11,619	12,703	12,825	12,875	13,113	13,495	13,795	102,456
NET EXPENDITURE	14,257	33,432	39,189	27,319	30,165	18,100	19,696	20,081	20,354	15,781	237,370

Note.—Due to rounding-off the sum of the individual items may differ slightly from the total.

CHAPTER 8

INDUSTRIAL PLAN

Part I.—Scope and Nature of the Programme

THE industrial plan falls into three parts. The first is concerned with the preparation of a detailed programme for large-scale and medium scale industry ; the second, with the changes in organisation and Government policy which are implicitly assumed in the preceding section ; and the third, with the need for an expansion of small-scale and cottage industries and the scale of and methods by which this should be carried out.

THE NEED FOR INDUSTRIALISATION

The reasons why it is necessary to take immediate steps towards establishing a rapid rate of industrialisation in Ceylon have been advanced in an earlier part of this Report (*see* Part I Chapter I, section iv). All that is necessary here is a brief recapitulation of them. The need for industrialisation stems from two basic conditions of the economy of Ceylon. The first is that the current rate of population growth and with it, of the work force, is very high by world standards. The rate of growth of the latter is indeed expected to become even higher after 1963. The second is that opportunities for absorbing this population growth within the traditional central industries of Ceylon—peasant agriculture and plantation crops—are strictly limited even when extensive irrigation works and land settlement are taken into account. This in turn means that expansion in the service industries both public and private, based on these traditional activities is also limited. If the expected rate of population growth is to be absorbed into employment and standards of living are to be raised the inescapable conclusion is then that industrialisation must be pursued in order to provide employment opportunities in its own right and to make possible larger-scale absorption of employment in the service industries which this industrialisation would make possible. Through this process, of course, in addition to more jobs being created, national income will increase and the general standards of living will improve.

MARKET BASED ON IMPORT REPLACEMENT AND POPULATION GROWTH

One of the basic economic problems which face a country such as Ceylon when it embarks on a programme of industrialisation is whether the local market is sufficiently large for it to be able to absorb the output of economic production units. In fact for a considerable range of commodities this need not be a bar to industrialisation in Ceylon. Because of its relatively high standards of living and its high dependence on export crops it has over a long period come to be dependent on an impressive volume of imports. Many of these commodities are imported on a scale which means that the potential market for domestic production is quite large enough to support production in Ceylon by factory units of an economic size.

Furthermore, when planning for industrialisation over a period of years it is not the present rate of consumption that is relevant but, at the very least, consumption at the time when the factory is likely to come into production, i.e., at least two to four years ahead from the time when the initial plans for the production unit are being prepared. In those cases where the size of the market is still marginal in terms of the economic size of the production unit it might still be practicable to look still further ahead when planning desired capacity. On the one hand temporary losses arising from temporary excess capacity may well be outweighed by the economies which will be realized when demand is in fact large enough in a few years time to absorb the output of a plant which is then operating to capacity on an economic scale of production. On the other hand during the period of temporary surplus capacity, it may be possible to build up new export markets if the plant is built on an appropriate scale.

It is in view of considerations such as these that the Planning Secretariat has prepared a detailed analysis of the present (1957) demand for imports and of the expected demand for them in 1968. The projections have been drawn up on two sets of assumptions. The first ones—the low projections—do not allow for any rise in living standards or increase in the rate of investment. They merely assume that these will be maintained at their present rates. The increased requirements arise simply from the expected increase in population by 1968. The second ones—the high projections—take into account not only the expected increases in population but also allow for some increase in standards of living and substantial increases in rates of investment. The indexes used have been derived partly from Mrs. Robinson's plan frame and partly from realized increases in per capita consumption and investment as indicated by trends in the import statistics since 1948.

The calculations of requirements of industrial products which are summarised in Table I, serve two purposes.

TABLE I

Industrial Imports* 1957 and 1968

(Rs. million)

Industry Classification	*Actual Imports* 1957	*Estimated Imports* 1968 *Low Projection*	*Estimated Imports* 1968 *High Projection*
Foodstuffs	180·9	250·7	293·0
Beverages	4·3	6·0	7·0
Crude materials	28·6	39·6	59·3
Mineral fuels, lubricants, &c.	146·0	200·5	254·0
Animal and vegetable oils and fats	3·0	4·1	5·4
Chemicals	119·4	164·6	209·8
Manufactured goods	381·5	523·3	773·8
Machinery and transport equipment	200·4	282·4	485·0
Miscellanoeus manufactures	92·8	131·2	151·8
Miscellaneous transactions	11·0	15·1	17·6
	1,167·9	1,617·5	2,256·7

* Industrial imports are either finished manufactured goods or goods which require industrial processing. Re-exports have been excluded.

First they indicate the magnitude of the needs which are likely to arise over the next decade. These needs will have to be met either by an expansion of exports or by a programme of import replacement. Failing a sufficient expansion of exports and/or an inadequate programme of import replacement the economy will be faced initially by balance of payments problems on a major scale and subsequently by a decline in real income as it will become increasingly difficult to import the volume of goods needed to maintain, let alone expand, levels of real income.

Secondly the Table indicates the size of the existing and expected market for industrial products. Presented, as it is here in broad industrial classifications, this Table is not a useful guide to the particular manufacturing industries which, in terms of market prospects and economic scales of production, seem practicable propositions. For this, naturally, a great deal of detail is required. While it is not convenient to present this detail here, it has been analysed and is available as a guide to future industrial development. It is important, however, to get an overall view of the potentialities of industrial investment in Ceylon and this the Table does provide. Assuming that it is potentially possible to replace two-thirds of these imports by domestic output (and it can be shown that this assumption is reasonable) and assuming that the ratio of realized capital expenditure to imports replaced is 2.7[1] then in terms of the 1957 import demands there would appear to be scope for an investment programme of Rs. 2,200 millions simply to replace imports. In terms of the 1968 high projection there are potentialities for import replacement industrial investment of the order of Rs. 4,000 millions. Clearly the scope for industrialisation via import replacement is large. Inadequacy of market demand is no bar to an ambitious programme of investment.

Given that this is the case and that rapid industrialisation is needed to provide employment directly and to provide the basis for a general expansion of the economy, then the question arises what are the fields in which industrialisation should take place. Before considering this question further, however, it is advisable first to consider a few general issues which are basic to the successful implementation of the investment programme.

First the planning authorities must be concerned about the provision of an adequate power supply. This question which is of major importance is taken up separately in another chapter. Secondly they should be directly concerned, not as has been the tendency in the past with a relatively large number of relatively minor projects but, initially at least, in meeting market requirements, present and expected in a limited range of products, the investment needs for which and the expected output from which are large enough to have a significant effect on the level of investment activity and on the subsequent course of economic development. Investment along these lines simultaneously contributes to the solution of a number of problems which a country such as Ceylon faces when it steps up its rates of industrialisation. On the one hand it economises the scarce administrative skills, demands for which are not seriously altered by the scale of the project which is under consideration. On the other hand, in those fields where it is technically optimum to have half a dozen or so units of production, it allows a staging of the industrial programme so that the detailed technical skills created in the running of one plant and the training for such skills, which can only fully be achieved under factory conditions, can be applied much more efficiently in organizing the running of the second and subsequent plants.

PLANNED AND UNPLANNED SECTORS

It is against this background of thinking that the following investment programme, which is based on discussions with and data supplied by the Ministry of Industries, has been drawn up. While it must be recognized that as the period of time extends estimates of costs, output, &c.,

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[1] This ratio is derived from the estimates made in Table V. In the longer run a higher ratio is likely to obtain, i.e., investment requirements are understated in the text.

necessarily become more tentative it must be realized that this is always the case in framing programmes of development. The point to be emphasised is that this programme is not something static but a framework which becomes progressively more detailed and concrete during the course of implementation.

It has been found convenient, partly because of inadequate statistics in the secondary industries field and partly because the pattern of ownership and sources of finance cannot be foreseen in advance, to divide the industrial programme into two sectors, a " planned " sector, and an " unplanned " one. It should be the Government's aim to ensure that, whatever else happens, projects within the planned sector should be brought into operation in accordance with the plan. The estimates in relation to the unplanned sector are more in the nature of targets which should be set for smaller-scale industrial enterprises. Here the Government's aim should be to provide facilities, to establish incentives, e.g., through taxation, protection, &c., and in general to create a favourable environment for investment rather than concern itself directly with specific proposals. The ways in which this environment should be created will be considered in more detail at a later stage. It should be made clear, however, that it is not intended that " planned " and " unplanned " should be synonymous, with " public " and " private " enterprise. The distinction is rather one of priorities. It may well become apparent that some of the projects within the planned sector would best be undertaken by private enterprise in which case the fact that these projects fall within the planned sector would merely mean that they have a high priority in terms of the Government's industrial programme taken as a whole.

SIZE OF THE PLAN FOR LARGE AND MEDIUM SCALE INDUSTRY

The scale and timing of the industrial investment programme have been estimated partly on the basis of the Ministry of Industries five-year programme and partly on considerations arising from the availability of real and financial resources. As far as is practicable the programme presented here implies a restrained rate of growth in the demands of the industrial programme on domestic resources. A somewhat higher rate of growth in the earlier years has been accepted partly because of existing commitments and partly because some of the schemes, e.g., textiles, are to be financed by foreign aid while others, e.g., cement, have already raised oversea loans to finance the foreign exchange content of the early stages of their investment programmes.

The general scope of the proposed industrial programme is indicated by the figures in Table II. When it is realized that in recent years net industrial investment has apparently only been of the order of Rs. 50 million per annum, made up in more or less equal parts of public and private investment, it will be realized that this plan implies an ambitious step forward towards industrialisation. There is no denying that it will be difficult to realize such a programme. Every endeavour must be made, however, to see that it is fulfilled, for on it depends, very largely, the performance of the economy as a whole. It will be seen that, initially the burden of industrialisation falls on the planned sector which is expected to be primarily Government enterprise. As the process gathers momentum, however, and as more satisfactory institutional and social relationships are established it is expected that an increasing proportion of the programme will be undertaken in the unplanned sector, i.e., primarily by private enterprise. It should also be noted that in the public sector what is proposed is an immediate stepping up of net investment which is then maintained for a period. Only in the last few years is a process of continuous expansion envisaged.

TABLE II

Industry Plan—Net Investment 1959–1968

(Rs. million)

	1959	*1960*	*1961*	*1962*	*1963*	*1964*	*1965*	*1966*	*1967*	*1968*	*1959–68*
(1) Total Net Industrial Investment	75	121	168	149	165	162	198	225	252	296	1,811
(2) *Less* Stock Accumulation	5	8	11	14	13	17	18	20	22	26	154
(3) Total Net Fixed Capital	70	113	157	135	150	150	180	205	230	270	1,657
(4) Planned Sector—											
(*a*) Fixed Capital	52	91	130	101	110	100	124	140	153	180	1,181
(*b*) Stocks	3	5	7	10	10	10	12	13	14	16	100
Total	55	96	137	111	120	110	136	153	167	196	1,281
(5) Unplanned Sector—											
(*a*) Fixed Capital	18	22	27	34	40	47	56	65	77	90	476
(*b*) Stocks	2	3	4	4	5	5	6	7	8	10	54
Total	20	25	31	38	45	52	62	72	85	100	530

DETAILS OF PROJECTS

A better indication of the nature of the industrial programme is indicated by Table III which provides a phased expenditure plan for the earlier years of the programme and Table IV which gives details of the Ministry of Industries programme excluding cement, fertilisers and sugar which are considered separately below. Some general observations should be made on these tables. First, unless there is downward revision of the scale of some projects (notably fertilisers) (see below pp. 367-70) or unless there is very slow response in the unplanned sector, no further projects (for example Ministry New Projects Nos. 6 to 9) should be scheduled to commence until

1965, otherwise excessive strains are likely to be placed on the programme at a number of strategic points. The exceptions to this rule may be the two stages of the proposed integrated steel plant, the tyre factory and the oil refinery. These possible exception are made because these projects are expected to be financed either by foreign aid from the Soviet Union on the one hand or by private foreign investment on the other. If these projects are undertaken at an early date the probability is that construction workers will have to be imported from abroad. Thirdly it should be noticed that not all the projects, included in the plan have been examined closely by the Planning Secretariat. Thus on further examination it may prove to be the case that the capacity of the hardboard factory should be greater than is at present proposed. On the other hand a thorough examination of the nature of the market for rayon cloth will be necessary before it will be possible to calculate the relative quantities of the different qualities of rayon that should be produced. Until this is done it is impossible to assess the economics of the proposed plant. Finally it should be noted that while the phasing of expenditure on individual projects is somewhat arbitrary and may be subject to revision the plan implies that if under-spending should occur in the early stages every endeavour must be made to catch-up in later years.

TABLE III

Planned Sector Fixed Capital Expenditure 1959–1968

(Rs. million)

Project	*1959*	*1960*	*1961*	*1962*	*1963*	*1964*	*1965*	*1966*	*1967*	*1968*	*1959–68*
Cement	6·5	36·0	40·0	21·8	12·3	14·9	25·5	18·0	19·0	26·0	220·0
Fertilisers		1·0	10·0	50·0	59·0						120·0
Sugar	25·0	15·0	40·5	17·0	12·5	25·5	13·5	5·0			154·0
Power alcohol		6·0		2·7	2·7	2·7					14·1
Rayon					2·3	11·7	12·0	15·0	17·0	11·0	69·0
Hardboard					8·6	4·6					13·2
Paper						25·0	20·0				45·0
Cotton spinning and weaving	10·1	12·5	20·0		2·0	13·0	15·0	15·0	15·0		102·6
Salt	2·0	2·3	9·7	2·0	3·0						19·0
Paranthan Chemicals						2·6	13·4	10·0			26·0
Bricks and tiles	·5	1·9	2·5	2·5	2·5						9·9
Drugs		·5									·5
Ceramics		7·9	2·6								10·5
Gintota plywoods	1·0										1·0
Leather	2·2										2·2
Ilmenite	4·1	2·7									6·8
Industrial estates	·5	5·0	5·0	5·0	5·0						20·5
Total existing projects	51·9	90·8	130·3	101·0	109·9	100·0	99·4	63·0	51·0	37·0	834·3
New projects	Nil	Nil	Nil	Nil	Nil	Nil	24·6	77·0	102·0	143·0	306·6
Total fixed capital expenditure	51·9	90·8	130·3	101·0	109·9	100·0	124·0	140·0	153·0	180·0	1,180·9
Working capital	3·0	5·0	7·0	10·0	10·0	10·0	12·0	13·0	14·0	16·0	100·0
Total planned sector	54·9	95·8	137·3	111·0	119·9	110·0	136·0	153·0	167·0	196·0	1,280·9

TABLE IV

Details of Projects as supplied by the Ministry of Industries

Projects on which work has commenced

Project	Total Cost (Rs. M.)	Commence-ment	Completion	Output per Annum	Employment		Foreign Exchange	
					At commence-ment	On completion	Savings	Earnings
1. Ilmenite refinery	8·0	1957–58	1959–60	8,000 tons rutile		158 permanent		5·0
				60,000 tons ilmenite		150 seasonal		
				4,000 tons zircon				
2. Cotton spinning	15·0	1957–58	1959–60	2·2 m. lb. yarn		440		4·0
3. Salt and by-products	14·0	1957–58	1960–61	500,000 tons salt	500	3,000		7·5
				15,000 tons gypsum			1·5*	
				7,000 tons potash			2·1*	
4. Spinning and weaving mill	32·6	1958–59	1960–61	10 m. yds. cotton textiles		875	13·5*	
5. Kaolin refinery	2·2	1958–59	1959–60	1,500 tons refined kaolin		85	1·0	
				4,000 tons kaolin dust				
6. Tile factory	·9	1958–59	1958–59	1 million tiles		50	·2	
				600,000 bricks				

* Value of output

TABLE IV—(*contd.*)

Details of Projects as Supplied by the Ministry of Industries—*contd.*

Expansion Schemes

Project	Total Cost (Rs. M.)	Commencement	Completion	Output per Annum	Employment		Foreign Exchange	
					At commencement	On completion	Savings	Earnings
1. **Second kiln, Ceramic factory**	1·5	1958–59	1959–60	440 tons ceramic work		70	·6	
2. **Leather factory**	2·2	1958–59	1959–60	400,000 pairs shoes	300	450	1·3*	·35
3. **Paranthan Chemicals**	26·0	1959–60	1962–63	1,500 tons caustic soda 1,300 tons chlorine 7,000 tons super-phosphate 4,000 tons P. V. C. 3,000 tons calcium carbide 12,000 lb. carbon dioxide	178	890	15·0*	
4. **Gintota plywoods**	1·0	1958–59	1959–60	480,000 tea chests 5,000 unit doors 150,000 sq. ft. boards		100	3·6*	
5. **Expansion salt works**	7·0	1960–61	1962–63	100,000 tons salt 20,000 tons gypsum 40,000 tons magnesia		1,000	2·0	1·5

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* Value of output

TABLE IV—(*contd.*)

Details of Projects as supplied by the Ministry of Industries—*contd.*

New Projects

Project	*Total Cost (Rs. M.)*	*Commencement*	*Completion*	*Output per annum*	*Employment*		*Foreign Exchange*	
					At commencement	*On completion*	*Savings*	*Earnings*
1. Second ceramic factory	5·7	1959–60	1961–62	1,000 tons ceramic ware 200 tons sanitary ware 300 tons wall tiles		160	2·3	
2. By-products of sugar	140·0	1959–60	1962–63	420,000 gallons power alcohol 600 tons acetic acid 1,500 tons acetic rayon 20,000 tons hardboard				
3. Two cotton spinning and weaving-mills	80·0	1959–60	1962–63	30 million yards		2,000	40·0	
4. Brick and tile factories	10·0	1959–60	1962–63	15 million tiles 3 million bricks		300	2·3	
5. Paper factory	45·0	1959–60		Under investigation				
6. Foundry and machine tool factory	15·0	1959–60		do.				
7. Glass sheet and utility ware	2·0	1959–60		do.				
8. Telecommunication equipment	5·0			do.				
9. Prefabricated housing	2·0			do.				
10. Steel rolling mill	25·0	1960		do.				
11. Iron ore mining and steel smelting	100·0	1961		do.				
12. Rubber tyre and tube factory	30·0	1960		do.				
13. Oil refinery	150·0			do.				

RESULTS IN TERMS OF OUTPUT, EMPLOYMENT AND IMPORT SAVINGS

Table V, which estimates the outcome of the industrial investment programme in a variety of fields, will only be realized if the cost estimates, &c., supplied to the Planning Secretariat are accurate and if the investment expenditure targets both in terms of amount and of timing are achieved. If these conditions are accepted then the Table can be taken to indicate the order of magnitude of the profits available for re-investment, the size and timing of the foreign exchange burden, the potential level of employment and expected demands on the electricity supply system. The electricity supply situation is considered in more detail in another chapter and the question of re-investment will be examined further below. For the moment then comment on this Table will be limited to the foreign exchange and employment aspects.

Any country which is dependent on foreign sources for the greater part of its plant and machinery requirements must be prepared to meet short-term strains on the balance of payments when it increases its rate of industrialisation. The foreign exchange requirements for capital expenditure on industry become evident at an early stage while the fruits of that expenditure in terms of imports savings develop relatively slowly and with a time lag which is dependent on the period of time required to bring factories into production. On the assumptions implicit in Table V the period of this immediate strain on the balance of payments is from 1959 to 1961 inclusive. Row 5 of Table V which provides the data to illustrate this point is, however, a misleading guide to the impact of industrialisation on foreign exchange requirements in later years. It does not take into account the expected increase in the demand for imports of industrial commodities other than those whose initial and increasing demand is being met by import replacement. Rows 6 to 11 of Table V attempt to indicate the magnitude of the demand for industrial imports when considerations of this type are taken into account and when allowance is made for the import content of depreciation charges on new industrial capital equipment. The main point to observe here is that an industrial programme of the magnitude of the one which is proposed here and one which is directed towards import replacement is not even capable of reducing the net demand for industrial imports prevailing at the beginning of the planning period. Broadly speaking it merely absorbs the increase in demand for industrial imports which increasing population and slightly rising living standards would otherwise have required. There should, however, be a substantial change in the composition of imports as between the beginning and end of the plan, .ie., the various types of consumer goods will be imported in different proportions to what they are now and there will probably be larger imports of intermediate goods and smaller once of finished consumer goods.

While row 11 of Table V must not be taken to measure the net demand for foreign exchange for the economy as a whole—it does not take into account, for instance, either the import replacement aspects of the agricultural programme or the foreign capital equipment requirements of sectors other than industry or increases in export earnings—it does indicate the magnitude of one of the major pressures on the balance of payments. While the issue can only really be decided in the light of a thorough examination of all aspects of the balance of payments this Table does tend to indicate that the country will have to obtain assistance from abroad. This assistance may, of course, be sought in a variety of forms either by foreign aid or a programme of foreign loans or, more specifically in the context of this chapter, either by negotiating management contracts for some of the larger items of the industrial plan such as the rayon or fertiliser factories or by taking positive steps to encourage direct private foreign investment. Some of these issues will be considered further in the second section of this chapter.

TABLE V

Aspects of the Industry Plan*

(Rs. million)

	1959	*1960*	*1961*	*1962*	*1963*	*1964*	*1965*	*1966*	*1967*	*1968*
1. Gross value of output	13	28	89	179	247	430	520	655	780	1,015
2. Gross profit	3	7	22	45	62	108	130	164	195	255
3. Foreign exchange capital cost	40	65	100	90	100	105	130	160	190	225
4. Import savings	5	15	40	90	135	230	280	340	385	455
5. Foreign exchange balance (4–3)	—35	—55	—60	Nil	45	120	150	180	195	230
6. Additional demand for industrial imports of consumer and intermediate goods	50	100	170	240	310	355	430	500	570	640
7. *Less* import savings	5	15	40	90	135	230	280	340	385	455
8. Balance (6–7)	45	85	130	150	175	125	150	160	185	185
9. Industrial new capital equipment imports	40	70	100	90	90	110	125	145	165	190
10. Import content depreciation			5	10	15	20	25	30	35	40
11. Total additional imports (8+9+10)	85	155	235	250	280	255	300	335	385	415
12. Operational employment ('000)	1	2	5	11	16	22	28	34	44	63
13. Power requirements (million k. w. hs)										
M. W. capacity		·4	7	17	25	50	58	76	84	104
Energy requirements		2	31	75	110	300	330	410	450	530

* For a discussion of the assumptions behind these projections see Appendix I.

The expected direct absorption of employment by the proposed programme of industrial investment is indicated in row 12 of Table V. In assessing the implications of this estimate it must be remembered that the employment potentialities of the industrial plan should not be judged simply in the light of the direct employment which it offers. On the one hand the scale of the programme is such that it implies that in the tenth year there will be some 50,000 workers engaged in the construction of industrial plants in the course of erection. On the other hand, one of the major functions of the industrial programme is to provide a basic framework in terms of output and income, which will make possible large-scale indirect employment in all types of Government and private service industries. Employment in these spheres should be at least of the order of magnitude of direct employment in industry itself. Still further, apart from the indirect demand for employment in agricultural production which would arise from the industry programme, there would be numerous specific links with employment opportunities in agriculture. Thus on the proposed scale of expansion of the sugar refining industry there is an implied demand for some 23,000 workers to be employed in sugar growing industry. As will be indicated below there are reasons for believing that the output of the sugar refineries should be substantially larger than is at present planned in which case the demand for sugar plantation workers might be of the order of 40,000.

FINANCIAL IMPLICATIONS

It is now time to examine some of the financial implications of the industrial investment programme. At first sight an aggregate net investment programme of Rs. 1,800 million over a period of ten years may well appear to be altogether too ambitious simply because of financial considerations. If, however, the Government does not attempt to seek early benefits from the investment programme by lowering prices to the consumer, if it consciously aims in its own plants at the maximum re-investment of the profits from the operation of its factories ; and if it frames business taxation policy in a way which favours profit retention it should be possible to meet a considerable proportion of the cost of the industrial investment programme through a policy of re-investment. That this may be so is illustrated by Table VI, which is drawn up in order to show the potentialities of a programme of re-investment. Like Table V the timing of the appearances of surpluses is dependent on the phasing of the investment expenditure. A slower rate of expenditure in the earlier years coupled with a faster rate of growth of expenditure in the later years could substantially lower the contribution which profit retention can make towards the cost of financing the programme.

Even if profit retention is exploited to the full there still remains a major financial problem, i.e., on the above figures the net cost of the industrial programme after allowance for profit retention is of the order

TABLE VI

Gross and Net Industrial Investment 1959–1968

(Rs. million)

	1959	*1960*	*1961*	*1962*	*1963*	*1964*	*1965*	*1966*	*1967*	*1968*	*1959–68*
(1) Net investment	75	121	168	149	165	162	198	225	252	296	1,811
(2) Depreciation on existing Capital Stock	15	15	15	15	15	15	15	15	15	15	150
(3) Depreciation on new investment			5	14	27	38	47	60	73	89	353
(4) Gross investment (1+2+3)	90	136	188	178	207	215	260	300	340	400	2,314
(5) Gross profit on new investment	3	7	22	45	62	108	130	164	195	255	991
(6) *Less* dividends unplanned sector			2	5	8	12	16	22	28	35	128
(7) Potential gross savings on new investment (5—6)	3	7	20	40	54	96	114	142	167	220	863
(8) Pre-plan gross savings	55	55	55	55	55	55	55	55	55	55	550
(9) Total gross savings (7+8)	58	62	75	95	109	151	169	197	222	275	1,413
(10) Ratio gross savings to gross investment per cent	65	46	40	53	53	70	60	57	65	68	61
(11) Net savings on new investment (7—3)	3	7	15	26	27	58	67	82	94	131	510
(12) Pre-plan net industrial savings	40	40	40	40	40	40	40	40	40	40	400
(13) Total net savings (11+12)	43	47	55	66	67	98	107	122	134	171	910
(14) Ratio net savings to net investment per cent	57	39	33	44	41	60	49	46	53	58	50
(15) Net investment less net savings (1—13)	32	74	113	83	98	64	91	103	118	125	901

of Rs. 900 million of which about Rs. 650 million would be in the planned sector, Rs. 250 million in the unplanned one. It is easy, however, to exaggerate the magnitude of this volume of investment. To a very large extent it reflects the high absolute figures of the ninth and tenth years of the Plain. In point of fact the real strains of the programme both in physical and in financial terms occur in the first few years when the absolute amounts of net investment are not particularly high. Once the process is under way, assuming that policy is directed towards achieving the maximum amount of re-investment of surpluses, and given the rates of expenditure at present proposed, the net demand for finance by industry does not rise significantly after 1962 until 1966 (see row 15 of Table VI) which given rising levels of output, income and savings, means that it become relatively easier each year to meet the financial burden of the industrial plan. If the rate of investment is phased differently, if it is lower in the earlier stages and higher in the later ones, the problem of finance will become less acute at the beginning but there will be a substantially longer period before the process of re-investment can make a real contribution towards making easier the problem of financing the programme as a whole. It still remains true however that a considerable mobilisation of financial resources will be necessary to implement the industrial programme. Some of the measures that will be required are discussed in Part II of this Chapter.

IMPLICATIONS FOR PRICING POLICY

There are some other aspects of the process of reinvestment that need discussion. First there is the question of pricing policy. Broadly speaking there are two alternatives available for Government controlled projects. The expected surpluses from a process of industrialisation can either be passed on to the consumers in the form of lower prices or prices can be maintained and the surpluses used to finance the expansion programme. Given that the investment programme must continue and is of highest priority then the former alternative is less desirable than the latter. If consumers benefit by lower prices then the finance for subsequent investment has to be raised from them either by loans or by taxation. If the surplus is retained its availability will be a direct incentive to the maintenance of a sustained programme of investment while at the same time it will minimise the strains on the budget which will necessarily arise while the investment programme is being pursued. As this is the case it is most important that the Government make a decision on this basic issue. Secondly, if it is favourable to the process of profit retention there would be considerable advantages if it formalised the situation by setting up an Industrial Development Fund distinct from the Consolidated Fund into which the dividends on capital, surplus receipts, &c., of Government business enterprises would be paid and from which payments would be made towards the finance of the investment programme. Thirdly it should be noted that it is not essential that the surpluses appear in the form of " profits ". There may well be advantages in tapping the surplus by imposing excise duties and or sales taxes on the output of new products. At the moment, however, this is a secondary consideration that can be left over for more detailed discussion at a later stage. Finally it must be emphasised that the appearance and scale of financial surplus is dependent upon the success of the actual physical processes of investment and factory operation. If there is faulty planning of projects, if management is not efficient and if the labour force does not become sufficiently skilled and disciplined to factory conditions the financial surpluses will be slow to appear and when they do will be on an inadequate scale.

NEED FOR INTEGRATED PLANNING IN INDUSTRY

The importance of most of the questions of this type is considered in more detail in another section of this chapter. It is at this point, however, that the importance of the efficiency of the initial stages of planning should be emphasised. There are two general points which need special consideration. First there is the complexity of technical relationships within the industrial sector itself, i.e., it is increasingly the case as industry develops that the final products of one branch of industry from the raw materials of another one. Failure to make adequate allowance for this inter-relationship can only result in the appearance of bottlenecks which not only delay the whole process but which may also add considerably to the final cost of industrial products. Secondly industry is intimately connected with other sectors of the economy especially, in some cases, with agriculture for the supply of raw materials and with the transport industry for the supply of raw materials and the distribution of the finished products. Inadequate recognition of this at the planning level can be even more costly both in terms of time and final costs than inadequate intra-industry planning. Finally, the question of project formulation and preparation must be considered. Thus it is essential that due recognition be given to the fact that for any individual industrial unit there is a series of time intervals involved, namely, the selection of the individual project, the preparation of detailed technical and cost estimates, the preparations of tenders, the tendering period, the final construction period. With the exception of the construction period, the co-ordination of these periods is essentially a matter of efficient administration. Any failure of planning and administration at this level can be extremely costly. Thus if delays of this type should cause one year's delay in erection of the 400,000 tons of ammonium sulphate plant there would be a loss of output of Rs. 120 million and a loss of surplus available for re-investment of Rs. 37 million.

Not only is it necessary to plan well in advance it is also important that the planning authorities be in a position rapidly to assess the performance of the plan. This is not the place to discuss the detailed questions of administration that this involves. For such a discussion reference can be made to Professor Lange's paper.[1] In the context of the industrial plan as such there is one aspect of this process which merits discussion here, namely, the need for comprehensive and reliable statistics for the industrial sector, including both Government and private establishments. At the very least data should be collected annually, the returns being made up on a calendar year basis. The returns should be required to be filled in and returned within one month of the end of the calendar year. They should be tabulated and at least provisional results available by the end of the first quarter. Initially it might be sufficient to ensure that there is a full coverage of industrial establishments employing ten or more persons, though the ultimate aim should be to include all industrial establishments. The minimum information which should be collected along these lines would be: value of output, cost of raw materials used, cost of fuel and power, wages, number of employees, values of opening and closing stocks, depreciation charges, expenditure on new plant and buildings and planned capital expenditure for the next twelve months. As the process of industrialisation gathers pace and increasingly well integrated plans are adopted it is essential that information along these lines becomes available to the planning authorities as soon as possible after the completion of any one year so that weaknesses in the performance in particular areas can be quickly tracked down and so that remedial measures may be brought into action without delay.

There is one other general feature of the present industrial programme that should be noted. It so happens that the group of industries which forms the core of the planned sector and which was selected originally primarily on grounds of the existing and expected size of the market, have a common feature. Cement, sugar, fertilisers obtained from cracking oil and oil refineries are all chemical industries or industries largely dependent on chemical processes. Some of the smaller projects, salt and salt by-products and Paranthan Chemicals, also are within this field. There are sound reasons for taking advantage of this more or less accidental combination of projects within the field of industrial chemistry and chemical engineering. On the one hand there are good prospects for husbanding scarce educational skills and training facilities by concentrating on a relatively narrow range of technical and scientific skills. On the other hand the chemical industry generally is an expanding one in the context of the world market. If Ceylon can establish early leadership here in the South-East Asian area then there are reasonable prospects of her building up a substantial export trade. To the extent that she can make use of local raw materials such as salt, gypsum, power alcohol obtained from sugar by-products, &c., she will be in a position to make up for her otherwise relatively poor endowment of the natural resources required for the process of industrialisation. In fact in so far as raw material resources influence the character of the industry of any country it may be no accident that already there appears to be a bias in favour of industry dependent on chemical processes.

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[1] See O. Lange—" The Tasks of Economic Planning in Ceylon " in Planning Secretariat *Papers by Visiting Economists*, Colombo 1959.

DETAILED PROGRAMME FOR MAJOR INDUSTRIES :

The preceding discussion has, more or less, been in general terms. The nature of the process of industrialisation and some of the results of the present Plan can perhaps best be illustrated by a more detailed examination of some of the more important plans for the development of particular industries, namely those for cement, fertilisers and sugar.

CEMENT

Given the need for Ceylon to embark on a process of industrialisation and the need more generally, for an increased rate of investment for the economy as a whole there cannot help to be a marked increase in the demand for cement and concrete products. To meet this expanded demand there must be a vigorous expansion of the cement industry. Set a target of 1,000,000 tons of cement by 1968 by the Planning Secretariat, the management of the Ceylon Cement Corporation has recently produced a programme whereby that output could be reached. Quite independently, Dr. Robert H. Bogue, a United States consultant on the cement industry, who was in Ceylon recently in connection with negotiations for a United States Development Loan Fund foreign exchange loan for the Cement Corporation's immediate expansion plans, has estimated that Ceylon should be consuming cement in 1968 of this order of output..

The development scheme for the cement industry is a well integrated one. Attention has been given not merely to the reduction of ex-factory costs through lower capital costs per ton and lower labour costs per ton but also to the reduction of transport and handling costs which at the moment make up a high proportion of the total cost to the consumer, of domestic cement. By the building of harbour facilities at Kankesanturai and by the installation of adequate loading facilities there, considerable economics can be realized in the costs to the factory of fuel oil and other materials. Further by transporting cement clinker rather than the finished product and establishing cement grinding mills at Galle there can be further substantial reductions in transport costs. Provision is also made for the use of bulk handling facilities for the finished product which will permit still further reduction in transport costs.

The development scheme is not confined to plans for the production of cement itself but also includes schemes for the utilisation of substantial quantities of that cement in the manufacture of concrete products. Here there is a wide range of products—pre-cast concrete sections, prefabricated housing units, telegraph and electric poles, railway sleepers, &c.—the potential demands for which in Ceylon are very high indeed. For these products to be made cheaply and with correct physical compositions, and for the cement factories themselves to operate efficiently it is essential that adequate provision be made for the establishment in Colombo of a central research laboratory for the cement industry. This forms an integral part of the plan.

The long-term aim of the plan is to achieve an output of 1,000,000 tons of cement by about 1968. This is a really substantial increase on the present output of the industry of 75,000 tons but it should not be beyond the capacity of the economy either to achieve this rate of production or to absorb it into consumption. The existing plans which are currently being put into practice, are to raise the present output at Kankesanturai by putting in a second kiln which will raise output from 75,000 tons per annum to 200,000 tons per annum by 1962. As soon as this is completed it is proposed to begin installation of a third kiln which would increase output to 300,000 tons. In the meanwhile construction would have been commenced on a second set of kilns based on the limestone deposits at Puttalam. The exact site of this plant has yet to be determined but will lie somewhere between Colombo and Puttalam. In determining the best (i.e., cheapest) location for this plant fairly complex calculations have to be made which have to take into account the availability of supplies of water, clay and power and the balancing out of the relative costs of bringing the different types of raw materials to the plant from Puttalam and from Colombo. For cheap operation this second factory also implies the extension of the railway line some twenty miles north of Puttalam. The Puttalam factory is to produce 450,000 tons, whether this takes the form of three kilns of 150,000 tons capacity or two of 225,000 tons will be decided at a later stage.

A third factory is scheduled to begin production in 1968. The location of this factory is not yet decided. There are at least three potential sites, i.e., at Kankesanturai, at Puttalam or based on the calcareous muds in the vicinity of Galle. Further drilling and research is required at each of these sites to determine the availability of quantity and quality of raw material supplies at each of these sites before a decision on the location of the third plant can be reached. Of course availability of raw materials is only one of the factors affecting this decision. The final decision will rest at least as much on the relative transport costs to and from these possible sites.

There now follows a more detailed description of the various components of the cement industry programme, of their expected dates of completion, of their fixed capital costs and of their electric power requirements.

Cement Programme

	Completion Date	*Fixed Capital Costs (1959–68)*		*Power Requirements by end 1968*
		Total (Rs. M.)	*Foreign (Rs. M.)*	
(i) Expansion of Kankesan Cement Works for an increase in output of 225,000 tons per annum to a total output of 300,000 tons per annum	1962	36·5	27·5	4 M.W.
(ii) A second cement plant based on Puttalam with a total output of 450,000 tons per annum :				
1st kiln	1963	70·0	40·0	9 M.W.
2nd kiln	1965			
3rd kiln	1966			
(iii) A third cement plant, site not yet determined, total capacity 450,000 tons, 1st kiln to come into operation in 1968 ; second in 1969 on the assumption size of kiln 150,000 tons	1968	40·0	25·0	3 M.W.
(iv) Establishment of a clinker grinding and packing plant at Galle with a total output of 200,000 tons per annum partly based on imported clinker (for possible staging of this plant in two units see text)	1962	10·0	6·0	2–3 M.W
(v) Equipment and installations for economical distribution of finished products	Various	6·0	5·0	
(vi) Concrete products factories : various prestressed and pre-cast concrete sections, telegraph poles, railway sleepers, prefabricated houses &c. Ten factory units to be installed by end of plan period scattered over the Island, some in conjunction with industrial estates 1st unit in	1962	20·0	10·0	3 M.W.
(vii) Expenditure on extensions and construction of utilities including rail and docking facilities, power, water	Various	20·0	8·0	
(viii) Research Laboratories for cement and concrete	1961–62	7·5	5·0	

TABLE VII

Cement Industry 1959–1968

	1959	*1960*	*1961*	*1962*	*1963*	*1964*	*1965*	*1966*	*1967*	*1968*
1. Estimated volume of consumption ('000 tons)	285	325	380	435	505	585	680	775	890	1,000
2. Estimated volume of output ('000 tons)	75	75	75	300	450	450	600	750	750	900
3. Estimated imports ('000 tons)	210	250	305	135	55	135	80	25	140	100
4. Value of domestic output (Rs. M-) :										
(*a*) cement c. i. f.	7·5	7·5	7·5	30·0	45·0	45·0	60·0	75·0	75·0	90·0
(*b*) cement products				2·0	2·0	4·0	6·0	6·0	10·0	14·0
Total	7·5	7·5	7·5	32·0	47·0	49·0	66·0	81·0	85·0	104·0
5. Cost of cement output (ex-factory) (Rs. M.)	7·5	7·5	7·5	21·0	29·7	29·7	37·7	45·0	45·0	54·0
6. Operating surplus* (4*a*—5) (Rs. M)	Nil	Nil	Nil	9·0	15·3	15·3	23·3	30·0	30·0	36·0
7. Total capital expenditure (Rs. M.)	6·5	36·0	40·0	21·8	12·3	14·9	25·5	18·0	19·0	26·0
8. Domestic capital expenditure (Rs. M.)	4·0	14·5	15·3	9·4	2·8	4·4	12·6	9·1	10·0	10·0
9. Foreign capital expenditure (Rs. M.)	2·5	21·5	25·3	12·4	9·5	10·5	12·9	8·9	9·0	16·0
10. Foreign operational costs (Rs. M.)	2·3	2·3	2·3	9·0	13·5	13·5	18·0	22·5	22·5	27·0
11. Foreign exchange balance (4*a*—9–10) (Rs. M.)	2·7	—16·3	—20·1	8·6	22·0	21·0	29·1	43·6	43·5	47·0
12. Constructional employment	1,200	4,300	4,600	2,800	850	1,300	3,700	2,700	3,000	3,000
13. Operational employment : Cement	550	550	550	850	1,150	1,150	1,400	1,600	1,600	1,900
Cement products	—	—	—	300	300	600	900	900	1,500	2,100
Total	550	550	550	1,150	1,450	1,750	2,300	2,500	3,100	4,000

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*This calculation only takes into account the costs of producing finished cement at the factory. It does not represent the surplus available for reinvestment as allowance has to be made for selling charges, packing and distribution costs. It assumes that output is valued at c.i.f. prices.

2

There is only one item of the cement industry plan which the National Planning Council would, at the moment wish to alter. This is that it would prefer to see the third kiln at Kankesanturai come into operation simultaneously with the second kiln, i.e., in 1962. This raises no technical difficulties of plant installation for the Cement Corporation itself. There seems little doubt that the electricity requirements could be met, initially by the transfer of a 4 M. W. diesel plant to Jaffna, later, i.e., by 1963, by the extension of the proposed high-tension line from Kurunegala to Jaffna. The one possible technical obstacle is the availability of port facilities for unloading up to 200,000 tons of cement clinker at both KKS and Galle. The National Planning Council would therefore recommend that immediate steps be taken to find out whether it is technically possible to make the required port facilities available at these ports by 1962. If it is possible the required instructions should be issued and the funds made available. Simultaneously the Cement Corporation could be advised of the need to meet the higher target. It must be realized, however, that all these projects be undertaken simultaneously or at least completed by 1962. Otherwise, the cement industry would have idle capacity at both Kankesanturai and at Galle.

Table VII attempts to indicate the probable supply and demand situation in the cement industry over the next ten years. It must be emphasised that it should not be taken literally. Thus it should be pointed out that the Table assumes that 300,000 tons can be produced at Kankesanturai by 1962 which as the previous paragraph has made clear may not be possible because of lack of port facilities. It also assumes that future kiln sizes will be 150,000 tons whereas it may well be decided later that 225,000 tons is more appropriate. It is also assumed that import prices will remain constant. Despite these qualifications the Table is useful in indicating the general shape of developments over the next decade and in providing some guide to the benefits which may be expected from the process.

In the light of the previous discussion the National Planning Council recommends :

1. That the Government should inform the Ceylon Cement Corporation that the output of the cement industry should be increased over the next decade along the lines indicated in this report.

2. That the cement Corporation's immediate target at Kankesanturai should be stepped up to 300,000 tons *if* it can be shown that it is *technically* possible to provide the required port facilities at Kankesanturai and at Galle *at the right time.* If it is possible, the port authorities should be informed of the urgency of these needs and should be granted the funds that will be required. The Department of Government Electrical Undertakings should also be informed of this decision and be required to meet the electricity demands which are implicit in this programme.

3. The Railway Department should be advised that steps should be taken immediately to ensure that the railway is extended to the limestone deposits north of Puttalam by 1962.

FERTILISERS

The industrial project which may involve the largest expenditure on an individual plant is that proposed for producing ammonium sulphate. At the moment, however, while it is agreed that a plant of this type should form one of the essential parts of the industrial programme it is not yet possible to reach a firm decision on the required scale of output of the plant. Whatever the scale of the plant, the type of plant chosen will use the crude oil-cracking process.

Briefly the two competing views on the desirable scale of the fertiliser plant are as follows :—

1. It is estimated that Ceylon will be consuming 40,000 tons of nitrogen in 1963 and that, on the basis of the recommended applications of ammonium sulphate to the various major crops, should be consuming 80,000 tons of nitrogen by 1968. There is little doubt that at least until 1963 the form in which this nitrogen will be supplied to the soil will be ammonium sulphate. As nitrogen forms only one-fifth of the weight of ammonium sulphate this means that Ceylon's domestic needs in 1963 will be 200,000 tons of ammonium sulphate.

There are, however, increasing reports from the soil chemists that at least for certain types of crop and for certain types of soil there are preferable ways of putting nitrogen into the soil, notably either in the form of urea or of nitrogen phosphate. Hence while it is improbable that Ceylon's demands for ammonium sulphate will fall below 200,000 tons (the tea industry alone which is likely to continue to use ammonium sulphate should be consuming over 110,000 tons by 1968) the increase in the expected demand for nitrogen after 1963 might take the form of urea or ammonium phosphate. This possibility leads some advisers to suggest that the plant which comes into operation in 1963 should have a capacity of 200,000 tons of ammonium sulphate but that it should be constructed in such a way that its output of nitrogen will be capable of being doubled relatively easily, i.e., the layout, site preparation, &c., will be carried out on the assumption that the capacity of the plant is intended to be doubled within a short period of years. Whether or not the extension of that capacity in the second five-year period should be made to produce either ammonium sulphate, ammonium phosphate or urea can be left open, these advisers urge, until say, 1963 or 1964 by which time it is to be expected that the soil chemists should be in a position to make firm recommendations about the form in which nitrogen should be applied to the soil and the relative quantities of the different types of fertilisers that will be required.

2. There is, however, an alternative view. This is that Ceylon should produce 400,000 tons of ammonium sulphate in 1963. The argument in favour of this view is threefold. First it would enable ammonium sulphate to be produced more cheaply than would otherwise be the case. Secondly on the basis of the present cost estimates it would enable Ceylon to build up a valuable export market at a time when it is likely to require all the exports that it can get. Thirdly, in the event of the soil chemists being proved wrong or of their finding that the other types of nitrogen fertilisers are of restricted application, then it would be possible to meet Ceylon's expected growing demands for ammonium sulphate simply by progressively reducing the volume of exports. This situation is illustrated in Table VIII which assumes the 400,000-ton plant and a continued high demand for ammonium sulphate.

TABLE VIII

Fertilisers—Ammonium Sulphate, 1959-1968

	1957	*1958*	*1959*	*1960*	*1961*	*1952*	*1963*	*1964*	*1965*	*1966*	*1967*	*1968*
1. Expected consumption ('000 tons)	121	135	150	165	185	205	230	255	285	315	350	390
2. Production ('000 tons)								400	400	400	400	400
3. Export surplus ('000 tons)								145	115	85	50	10
4. Value of output (Rs. M.)								120	120	120	120	120
5. Cost of output (Rs. M.)								83	83	83	83	83
6. Operating surplus (Rs. M.)								37	37	37	37	37
7. Foreign exchange cost of output (Rs. M.)								46	46	46	46	46
8. Foreign exchange savings								74	74	74	74	74
9. Total capital cost (Rs. M.)				5·0	25·0	51·0	39·1					
10. Foreign capital cost (Rs. M.)				2·0	22·0	45·0	33·4					

Naturally the validity of this argument rests on the facts whether or not there would be an export market for Ceylonese ammonium sulphate and whether or not Ceylon would be able to compete in that market against Japan and the United Kingdom, its two most likely competitors. On the basis of information at present available (i.e., Table IX which gives comparative prices and Table X which gives the regional import surplus into Asia) it would appear that the proposed 400,000 ton fertiliser plant should have an adequate market and should be able to compete in terms of price. This evidence, however, is not a sufficiently strong basis upon which to make a decision now. Further examination of the export market and its prospects is necessary.

TABLE IX

Ammonium Sulphate Prices 1953–1958

(Rupees per Tons)

	U. K. f. o. r.	*Japan Wholesale*	*Ceylon c. i. f.*	*Ceylon Estimated exfactory price* **(400,000** ***tons capacity plant*)**
1953	223	315	290	—
1954	233	306	255	—
1955	252	296	310	—
1956	280	287	315	—
1957	n.a.	n.a.	340	—
1958	n.a.	n.a.	285	207

Ceylon prices from the Customs Returns. U. K. and Japanese prices from F. A. O. *Yearbook of Food and Agricultural Statistics* 1957, p. 337, converted into Rs. at 1 dollar = 4·77 rupees.

TABLE X

Asia—Consumption and Production of Nitrogen 1948/9–1956/7

('000 Metric Tons)

(July-June)	*1948/9–1952/3*	*1954/5*	*1955/6*	*1956/7*
Consumption	630	860	1,090	1,150
Less production	450	730	820	890
Regional import surplus	180	130	270	260
Less Ceylon imports	14	21	21	21
Potential market	166	109	249	239
Equivalent ammonium sulphate	830	545	1,245	1,195

Source : F. A. O. Yearbook 1957, p. 248, except for Ceylon imports 1956/7 which are estimated from the Customs Returns.

Recommendations

In view of the importance for Ceylon of the development of new export markets the National Planning Council therefore recommends:

(i) That immediate steps be taken towards setting up a nitrogenous fertilizer plant which would be expected to come into operation in early 1964. This implies the early appointment of technical consultants and at least provisional agreement on the site of the plant. The latter decision is important because of the heavy power (13 M.W. for a 40,000 tons Nitrogen plant 21 M.W. for 80,000 tons Nitrogen) and water requirements of the proposed plant.

(ii) That a decision on the initial scale of the plant should be left open until reports have been received—

(*a*) from the consultants, whose services have already been requested to draw up specifications and cost estimates for both a plant which could produce 80,000 tons of nitrogen in two stages each of 40,000 tons and also for a plant whose initial output would be 80,000 tons of nitrogen in the form of ammonium sulphate or in combination with sulphur, phosphorus and urea.

(*b*) from a responsible officer from the Department of Industries or some other suitable Department who has been instructed to make a detailed study of the present Asian market for nitrogen fertilisers and of its future prospects.

(iii) That if firm estimates should become available of trends in the relative use of nitrogenous fertilisers both in Ceylon and in the Asian region, the aim should be to build a plant to produce 80,000 tons of nitrogen which would be combined with one, two or three other compounds in the proportions indicated by the expected trends in utilisation.

SUGAR

The establishment of a group of sugar factories in Ceylon is an attractive proposition for a number of reasons. As is indicated in the chapter on agriculture the growing of sugar cane promises relatively high gross yields per acre and to that extent is clearly preferable to its most likely potential competitor, paddy. As almost the whole of the present consumption of sugar is obtained from imports there are large benefits to be derived in terms of foreign exchange savings. Looked at from the point of view of manufacturing, the present market is large enough to support three or four economically sized production units. Given the trend in demand as indicated by annual imports from 1948 to 1958 there should be scope for six or seven plants by 1968. On the cost estimates at present available the output of all of these plants will not only be easily competitive with imports valued c.i.f. but should also provide significant surpluses for re-investment. Finally the by-products of growing sugar-bagasse (the pulped stalks of the sugar cane after the juices have been extracted) and molasses (residual syrups) provide cheap raw material bases for further industrial expansion. The former is suitable for conversion into hardboard and paper the latter into power-alcohol which can be used directly as an additive to petrol or, preferably, as the base for a wide range of chemical products such as acetic acid, acetate rayon and hence rayon textiles, plastics and pharmaceutical products. This complex of by-product industries is not just a technical possibility, it is a description of what actually exists in a number of cane sugar growing countries.

As has been noted one advantage of entry into the sugar manufacturing industry is that the market is sufficiently large, at the moment, to permit the operation of three or four economically sized plants. This means that output can be increased in a series of steps experience gained in one plant being used to enable subsequent plants to be operated more efficiently, more quickly than would otherwise be the case. The present programme for the bringing into operation of new plants is as follows :—

Factory	*To commence in*	*Capital Cost (Rs. M.)*	*Capacity Output (000 tons)*
Kantalai I	1959	24·5	19·2
Gal Oya	1959-1960	31·5	40·0
Kantalai II	1962	40·0	60·0
Walawe I	1962	29·5	31·5
Walawe II	1965	29·5	31·5
	Total	155·0	182·2

Assuming that this programme is carried through according to plan the expected outcome in terms of output, operating surplus, foreign exchange savings and employment should follow the pattern described in Table XI.

TABLE XI

Sugar Industry 1959-1968

		1959	*1960*	*1961*	*1962*	*1963*	*1964*	*1965*	*1966*	*1967*	*1968*
High Demand Projection :											
1. Consumption	('000 tons)	187·5	197·5	207·5	220·0	233·0	245·0	260·0	275·0	290·0	310·0
2. Output		9·6	20·4	34·4	74·0	107·0	931·7	161·2	171·7	182·2	182·2
3. Imports		177·9	177·1	173·1	146·0	127·0	113·3	98·8	103·3	107·8	127·8
Low Demand Projection :											
4. Consumption	('000 tons)	180·0	185·0	192·0	197·0	202·0	209·0	215·0	222·0	228·0	235·0
5. Output		9·6	20·4	34·0	74·0	107·0	131·7	161·2	171·7	182·2	182·2
6. Imports		170·4	163·4	157·6	123·0	95·0	77·3	53·8	50·3	46·0	52·8
7. Harvested acreage ('000)		2·6	5·7	9·8	20·2	29·8	37·8	41·8	44·8	47·8	47·8
8. Ex-factory cost of output (Rs. M.)		5·1	9·9	16·8	32·9	45·5	50·6	58·5	63·2	65·7	64·1
9. Value of output (c.i.f.) (Rs. M.)		4·5	9·5	17·0	34·5	49·5	61·0	75·0	80·0	85·0	85·0
10. Operating surplus or deficit		—0·6	—0·4	0·2	1·6	4·0	10·4	16·5	16·8	19·3	20·9
11. Total capital expenditure (Rs. M.)		36·0	17·0	27·5	17·0	12·5	25·5	13·5	5·0		
12. Foreign capital expenditure		23·0	9·0	16·5	10·5	10·5	17·5	9·5	5·0		
13. Foreign exchange balance (9—12) (Rs. M.)		—18·5	0·5	0·5	24·0	39·0	43·5	65·5	75·0	85·0	85·0
14. Factory employment :											
Off Season		700	750	750	1,500	1,500	1,500	1,900	1,900	1,950	1,950
Season		980	1,020	1,020	2,020	2,070	2,090	2,540	2,590	2,610	2,610
15. Constructional employment		1,800	1,050	1,500	800	200	1,000	200			
16. Plantation employment (excluding harvesting)		1,300	2,850	4 900	10 100	14,900	18,900	20,900	22,400	23,900	23,900

It should be noted that at no time does the present Ministry programme attain self-sufficiency in sugar production. Given, for reasons already indicated, that this should be the objective, the present programme should be altered in one respect and provision should be made for two, perhaps three, additional plants. The alteration is that the Walawe II plant should be scheduled to commence operations in 1964 instead of 1965. One additional plant of at least 40,000 tons capacity should come into production in 1966. Whether or not a second additional plant should be planned for 1968 is not perfectly clear at the moment although it is highly probable that it will be necessary if self-sufficiency is to be achieved.

The case for a second additional plant depends on at least three considerations. First there is the fact that output in the first year can only be one-third of capacity because of the rotational crop pattern for growing sugar cane. Secondly the capacity output of the first additional plant has yet to be determined. Here the basic consideration is the nature of the area in which the sugar cane is to be grown for this in turn determines the area within a given radius beyond which the cost of bringing sugar cane to the mill becomes prohibitive. Thirdly the scale of expected demand for sugar cannot be determined sufficiently accurately ten years in advance. Depending on the level of the demand curve it may even be the case that a third additional plant should be coming into operation in 1968.

This latter point is sufficiently important to merit separate discussion. As Table XI shows, two projections of demand have been made for the purposes of this survey of the sugar industry. The " high " projection has been obtained by fitting a straight line to the imports series 1948 to 1958 plotted on a semi-logarithmic scale. The implied assumptions behind this procedure are that population will increase at the same rate over the next decade as it has in the past one (in fact the best population projection now available indicates that a slightly higher rate of growth will take place) and that the rate of increase of per capita consumption that occurred in the decade 1948 to 1958 will continue as before (i.e., per capita consumption which was 31.5 lb. in 1948 and 38.5 lb. average 1956 to 1958 will become about 50 lb. in 1968). The " low " projection has been obtained by multiplying the 1956-58 average per capita consumption by the expected total population for each year until 1968.

Two observations should be made on these estimates. On the one hand the " high " projection is not necessarily the limit to probable demand. If disposable real income of consumers should rise at a faster rate than in the previous decade still higher levels of consumption of sugar might obtain. On the other hand demand should fall below the " low " projection only if there is a serious failure of the over-all programme for expansion of the economy over the next decade. The implication of this discussion is that it will be highly probable that a second additional sugar factory should be brought into operation by 1968 and not at all unlikely that a third additional plant will be needed for self-sufficiency by that time.

As has been indicated an established sugar refining industry has considerable potentialities for setting up a variety of industries which make use of the by-products of that industry. It has not been possible, however, to make a full assessment of even those items which are at present included in the industry programme. There seems no doubt that, on the estimates available, the hardboard factory which would convert bagasse (crushed cane fibre) into hardboard suitable for making tea chests and interior wall boards should have a high priority. This is also certainly true of the plans for the production of ethyl alcohol from molasses. Before firm decisions are taken on the rayon plant however further investigations are necessary. While the present market for rayon textiles is large enough to support two plants on the scale of the one already proposed, a detailed market survey will be necessary before decisions can be taken on the proportions of the different qualities of rayon cloth that should be produced. Until this is done it is not possible to make a sound economic appraisal of the proposed plant. Further investigations should also be conducted into the economics of the proposed paper mill.

It must be emphasised that a sugar refining industry and the by-products industries which can be derived from it can only be established efficiently if there is careful co-ordination between the agricultural and manufacturing aspects of the industry. The agricultural implications of a programme aimed at achieving self-sufficiency in sugar are discussed in another chapter. Here all that it is necessary to point out is that this interdependence between industry and agriculture exists and that for the industrial programme to have substance agreement must be reached on the priorities of the agricultural programme and that assurances must be given on the availability of suitable land and on its availability at the right time. This latter guarantee, of course, depends on assured supplies of water. Steps must be taken to ensure that there are no further disputes about water supplies such as is at present taking place at Kantalai.

Recommendations

1. Because sugar offers higher gross yields per acre to agricultural producers (see Chapter 6) ; because, ignoring by-products, it promises roughly a three times greater yield per acre in terms of import savings (likewise) ; because it permits the development of a substantial sugar refining industry ; and because it has considerable potentialities as a basis for a wide range of by-product industries the Planning Council recommends that the sugar industry should have a much higher priority than rice in terms of land use and water supplies.

2. The present factory programme should be accepted as a firm objective except that Walawe II should, if technical conditions permit, be phased to commence operations in 1964. Additional factories should be constructed at regular intervals until self-sufficiency is achieved.

3. Active steps should be taken to ensure the full utilisation of by-products provided that this does not imply on excessive degree of protection.

Summing up

To ensure that the objectives of the industrial plan are realised similar programmes need to be drawn up for other industries—textiles, sugar by-products, &c. Such programmes need, of course, to be much more detailed, and questions of timing have to be determined more accurately than the preceding brief outlines which merely sketch out of the sort of issues which are involved and the desired courses of action. In the case of textiles, for instance, there needs to be a much more detailed appraisal of the structure of demand for different types of textiles than is necessary in the case of products like sugar or cement. In this case, too, it is necessary that there be detailed co-ordination of the Industries Department's plans for large scale spinning and weaving units and of the Small Scale and Cottage Industry Department's programme for the development of hand looms and small power-loom weaving. The textiles market is relatively large and there is plenty of scope for the development of both types of industry during the next 10 years. It is still the case that there must be careful co-ordination of policy in both fields.

Concentration on a series of specific programmes is nevertheless not enough. The developments in both the public and private sectors, outlined in the preceding paragraphs, implicity assume a variety of institutional, organisational and policy measures which need separate discussion. It has been considered advisable to examine this type of issue in a separate part of this chapter (Part II). It should also have been apparent that the relatively limited large-scale industrialisation which appears practicable during the course of the next ten years will not offer a complete solution to the problem of finding sufficient employment during this period. For this, and for other reasons, the Plan for industry as a whole places great emphasis on the expansion of small-scale and cottage industries. Part III of this chapter, outlines the role which they are expected to perform.

Part II.—Organization and Policy

In the previous section the required scale and magnitude of the industrial programme has been outlined. It is now necessary to consider some of the implications of that programme, failure to take adequate account of which can only result in delayed realization of the programme. Discussion will be centred on six aspects of industrialisation in Ceylon, namely: (1) the need for an adequate protective tariff; (2) the steps which have to be taken to ensure adequate supplies of management skills; (3) the availability and quality of the labour force; (4) the supply of and market for industrial finance; (5) the role and scope of foreign investment; and (6) morale. It should be noted that these questions will be considered only in relation to the industrial programme. It should also be noted that some issues which have a direct bearing on the industrial programme, notably the need to create a *modus vivendi* between public and private enterprise and the need for a generally favourable social and economic climate for the latter to flourish, are not discussed separately here because the issues involved have been discussed elsewhere in this report.

PROTECTION

It was argued in an earlier section of this chapter that industrialisation in Ceylon should take advantage of the markets which already exist for industrial goods in the form of imports by consciously aiming at a process of import replacement of those industrial goods which are consumed or are likely to be consumed in the near future on a sufficiently large scale to permit local production on a reasonably economic basis. While there are probably a large number of commodities which fall within this category it is unlikely that, for the time being at least, they will be produced locally as efficiently as they are abroad. Consequently for there to be an adequate degree of industrialisation it will be necessary to establish a systematic protective tariff and/or system of subsidies.

Some protection to local industry at the moment is being given through the operation of the Industrial Products Act, and the customs duty levied for revenue purposes. In several cases customs duties have been raised with the protective end in view. However very little rational attempt seems to have been made to assess the need for and the consequences of protection. The Planning Council strongly feels, therefore, that a permanent Tariff Commission should be set up somewhat on the Indian model.

The first task of the Tariff Commission should be to make a thorough examination of the existing rates of Tariff and in conjunction with the Department of Industries and interested local bodies to prepare a systematic schedule of protective duties and/or subsidies. As soon as possible this new schedule of duties should be published. In the case of commodities not yet produced in Ceylon the relevant protective duties should not become operative until such time as local substitutes begin to come onto the market. When this happens the new duties should come into operation almost automatically, i.e., as soon as it can be shown that domestically produced substitutes are available on the market. It is only when the degree of protection to be expected is unambiguously known beforehand that local firms are likely to take positive steps to compete with a wide variety of imports. When it is known that a particular level of protection is available and that it will be enforced once local production has begun, local industrialists will be able to make much more reliable estimates of the risks of undertaking the production of a particular commodity than is at present the case. The protracted nature of the negotiations which are at present required for protection of a new commodity and the uncertainty as to their outcome cannot but be a strong inhibition to potential local industrialists. This inhibition must be removed, and replaced with positive incentives.

As part of its first task the Commission should be empowered to look into the question, not only of tariffs, but also of subsidies to enterprises. These may be subsidies granted on products where it is undesirable to raise the prices to the consumers. They may also be given specifically to certain industries with a view to encouraging them to produce new items. Subsidies have the advantage over tariff protection, to some extent, that the funds have to be voted and therefore that the Government and the people are made conscious of what actual burdens are incurred to support the enterprise, whereas the costs of protection by means of tariffs generally remain hidden. Subsidies also have the advantage of a separate and periodic review of each enterprise receiving such a subsidy. It makes the State, therefore, a watch-dog of efficiency over the subsidised enterprises. The disadvantages of subsidies, on the other hand, are the vested interests and political pressures they create, in addition to the fiscal and administrative difficulties in raising the revenue required for the payment of the subsidies. The Commission should fully review in the case of each enterprise or industry, whether incentives should be provided for through tariff protection or subsidies.

In view of the above recommendations regarding protection for a nascent industry, the question of the usefulness or otherwise of the present Industrial Products Regulation Act presents itself. The principles on which the Act has been based have been critizised. The actual working of the Act has also left much to be desired. The malpractises which have arisen have created significant difficulties in the enforcement of the Act. The Planning Council would therefore, suggest that the measure be reviewed and a decision be taken whether it is necessary to modify or even continue it in addition to the other measures for protection outlined above.

Following the setting up of the Tariff Commission a clear distinction should be made in the tariffs schedule between the protective and revenue duties. While the rates of protective duties may be high, the *raison d'etre* would be the reduction of imports and hence a possible loss in revenue. Where duties are levied for revenue purposes, excise taxes may be levied on competitive domestic production so that revenue duties may not result, unless so intended, in a subsidy to the local producers.

It is an incongruity in a country which wishes to industrialise that there should be any import duties levied on essential raw materials, machinery, equipment, and components thereof. The Planning Council recommends that these duties should be abolished. This need not necessarily mean a loss in revenue because such reduction may be more than compensated by revenue from taxation of new incomes and profits[1].

FORMATION AND MANAGEMENT OF NEW ENTERPRISES

Up to the present there has been relatively speaking a dearth of new industrial enterprises in Ceylon. This has been due to a variety of reasons but probably the major one has been the fact that the returns offered from domestic industrial enterprise operating virtually in direct competition with the world market have neither been sufficiently high or sufficiently assured to be attractive in relation to other outlets available for domestic investment—notably in plantation crops, real property and money lending. While the proposed fairly highly protective tariff should be sufficient to alter basically the relative attractions of these traditional fields of investment in favour of industrial enterprise, it may well be the case that local enterprise will still not be forthcoming at a sufficiently rapid rate to meet the present needs of the economy. Still other inducements may be necessary.

One suggestion for meeting this problem has been put forward by the Ministry of Industries, namely, the setting-up of a Ceylon Industrial Promotion Corporation. It would provide, the necessary institutional machinery through which private initiative could be harnessed to serve the needs of the country in the context of Government policy, particularly in the field of small-scale enterprises which today lack the necessary experience to search for and avail themselves of facilities which the Government is prepared to provide[2].

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[1] Paragaphs 3, 5, 6, 7 and 8 are quotations from the Committee on Industrialisation—Report on Incentives to Private Investment in *Reports of Committees and Technical Working Groups* Planning Secretariat, Colombo, 1959.

[2] The following extract gives a detailed statement of the Ministry of Industries' proposal.

" The objects of this Corporation would be—

(i) to search out for industrial opportunities (i.e., any activity which can be developed as an industrial unit) ;

(ii) to have such projects fully investigated and valued;

(iii) if the results of such investigations are satisfactory, to have full project details worked out with regard to raw materials resources, likely markets, costs, capital requirements and other ancillary matters ; and

(iv) once the project has been decided upon, to select suitable personnel to finance and run the industry, if necessary with assistance from the Corporation, to take all necessary legal steps to incorporate the unit under existing law.

" It would be necessary to incorporate the Ceylon Industrial Development Corporation by a special Act of Parliament. Parallels are available in India, Mexico, Burma, Pakistan, Turkey and several other countries and even in the United Kingdom. An Act of Parliament which would set out the objects in brief could provide necessary legislation defining the functions of the Board.

" It is considered that, as an initial step, the Corporation be given a working capital of Rs. 2 million as it would be deriving income from promotion and cash shares. It is expected that the Corporation would be partly self-supporting after some time.

" The Corporation will have to incur certain amounts of expenditure for the following :—

(i) Administration,
(ii) Consultants' fees,
(iii) Travelling expenses of experts, &c., and
(iv) Promotional expenses.

" As usual any trades of this type which serve the community should be exempt from payment of Stamp Duty, Income Tax and other levies and, further, that contributions to this organization should be permissable deductions for purposes of Income Tax as in the case of the C.I.S.I.R.

" The Corporation will consist of a mixed body of officials as well as non-officials. The officials may consist of representatives of the Ministry of Industries and Finance and Departments of Industries, Treasury, Government Stores and Electrical. Undertakings and the Development Finance Corporation. Personal nominations to the Board may be made at the discretion of the Minister of Industries from persons chosen for their own abilities and experience in the industrial fields.

" The powers of the Corporation will include the following :—

1. Generally to call for information from the private sector relating to industrial matters under the proposed Industrial Regulations Act.
2. To appoint and recruit staff, consultants and contractors, including the appointment of Public Officers to the staff of the Corporation, as provided in the State Industrial Corporations Act, No. 49 of 1957.
3. To raise its own funds by way of overdrafts, loans, debentures, &c., as provided in the C. I. S. I. R.
4. To contribute to the share capital of industrial units and to take shares in lieu of services rendered.
5. To render services on payment of fees.
6. To give financial assistance by way of granting loans to industries and to secure the payment of such loans.
7. To do anything necessary for or conducive to or incidental to the attainment of the objects of the Corporation. "

While this scheme has much to commend it, it is not at all certain that it is workable under conditions in Ceylon. It may be the case that, even when cut and dried projects are available on tap, suitable managers are not forthcoming to put the projects into actual operation. In order to ensure rapid and efficient adoption of its projects it may be necessary to think of the Promotion Corporation in more ambitious terms, i.e., as a multi-purpose industrial corporation which would not only prepare schemes but put them into operation and run them until such time as private management and investors are willing and able to take them over. Whether this would be necessary or not cannot be foreseen in advance. At the moment it might be best to proceed with the Promotion Corporation on the lines indicated on the understanding that, if private management should not be forthcoming, steps should be taken to alter the powers and functions from a simple promotion corporation to one which would actively engage in management [1].

Whether or not such a corporation is established, it will still be the case that active steps should be taken to provide training facilities for higher management. Quite a few of the new projects or expansion schemes imply operation of industrial firms much larger than has been customary in Ceylon. It is to be expected, too, that there will be a considerable number of new medium-sized firms. Firms of this size can only run efficiently if such people as sales managers, personnel managers, company secretaries, &c., have the advantage of the specialised training that is now available in these fields, and if there is an adequate supply of engineers and accountants. There is an urgent need in Ceylon for the establishment of a school of business management that could cater for these needs in at least two different ways : firstly through the provision of facilities for the part-time training of people already employed or likely to be employed at short notice in such positions and who have not received specialised training of the type required ; and secondly through the provision of full-time training facilities for accountancy, business administration, sales and personnel management, &c., at a much more advanced level than is at present available or proposed to be available at the Technical College.

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[1] For further discussion of this issue see Professor Galbraith's report which was made after this paragraph had been written. J. K. Gailbraith " Industrial Organisation and Economic Planning " in *Papers by Visiting Economists*, Planning Secretariat, Colombo, 1959.

MANPOWER AND TRAINING

Any programme of industrialisation calls for a wide variety of technical skills ranging from those of the highly skilled scientific research worker to those of the worker at his bench or lathe. It is essential to see that training facilities exist or are being provided to ensure that the required kinds and quantities of skills are or do become available. This should not be taken to mean, however, that the rate of industrialisation should be held back because, at present, the required skills are not available. To a very large extent particularly in the lower ranges of skills (involving by for the greatest number of employees) the required skills can only finally be acquired at the work-bench, &c., of a factory which is actually operating. It is much better to have a factory in existence and, in effect, be forced to acquire the required skills than to hold back until it is obvious that the skills are already available. On the other hand this does not mean that steps should not be taken now to see that skilled labour supplies do become and are becoming available as quickly as possible in as large numbers as is possible.

It must be recognized that a determined drive towards industrialisation requires attention to future labour supplies at almost all levels of the educational process. Up to the present the bias in the educational system has been towards liberal arts rather than practical and technical education. Even in the field of technical training it is knowledge of general theory rather than its practical application which has been encouraged. This has brought about a situation where there is large-scale unemployment of unskilled workers at the same moment that there exists a critical shortage of workers with mechanical and technical skills and even semi-skills.

The long-term solution “ to this problem lies in changing the educational system. Thus, industrial training must begin at school with a distinct bias in favour of manual and practical work. Practical craftsmen and technicians from industry ought to be enrolled as part-time instructors in practical classes in schools. At this level of practical work, the opportunity could be taken to test the pupils for work aptitude or preference. From the practical classes in schools students may be directed to special trade schools, rather than academic university training. The trade schools would provide both practical and theoretical training, advise pupils on job availability, supply industries with suitably trained practical manpower and provide refresher and advanced courses for already employed workers who desire to acquire further techniques.[1]"

The immediate need then is to make provision for a system of trade schools and higher technical education. The present plans for development in this field by the Ceylon Technical College Department which have been approved by the Minister of Education and which are proposed to be implemented over the next five years are as follows[2] :—

" (a) *Institute of Practical Technology,* Katubedde

The present Engineering section of the Ceylon Technical College will be shifted to the new premises at Katubedde and will function as a separate unit. The buildings are almost ready and the equipment is being installed as it is being received. The Institute will have residential facilities for 200 students. The shops, laboratories, class rooms, drawing offices, &c., are designed to accommodate approximately 500 students at a time. There is plenty of room on the premises for further extension.

" This Institute will cater for the middle or technician grades of employees in industry. For the present it is proposed to provide instruction in the following branches of engineering with additions as the demand warrants :—

(*a*) Construction and Works Services (Civil) ;
(*b*) Building ;
(*c*) Metal work :
(*d*) Wood work ;
(*e*) Electrical ;
(*f*) Radio and Electronics ; and
(*g*) Chemical.

At present the Junior Technical Officers' course is in three sections : (1) Civil, (2) Electrical and Mechanical, and (3) Chemical. By further sub-division as proposed it is hoped to provide more intensive and practical instruction in the particular field.

" (b) *Junior Technical Schools* in the provincial capitals, 9 in all

Of these the one at Galle is functioning and the buildings for the one at Kandy have been taken over while the buildings for the school at Jaffna are almost ready for occupation. The equipment for the schools at Kandy and Jaffna are on order and the staff is being recruited. Provision has been included in the current year's estimates for buildings for these schools at Badulla, Anuradhapura and Nawinna.

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[1] Quoted or paraphrased from Report on Incentives to Private Investment.

[2] Quoted from a report by the Director of the Ceylon Technical College Department

" For the present only the basic equipment for instruction in Woodwork, Metalwork, Motor Mechanism, Electric wiring, and in Commercial subjects like Shorthand, Typewriting and Book-keeping is being provided. For the present each school is designed to cater for about 40 in the Commercial Section and 60 in the Trade Section in the first year and similar numbers in the 2nd year. Future expansion of these Junior Technical Schools will be according to the local needs which will have to be decided as the occasion arises.

" (c) *A Trades School* in Colombo (Maradana)

Plans are being drawn up by the P. W. D. for the buildings for which provision has been included in the current year's estimates. This will cater for instruction in the following major groups of trade :—

(i) Building, (ii) Woodwork, (iii) Metalwork, (iv) Electrical, (v) Motor, and (vi) Printing.

There will of course be sub-divisions within these major groups into specialised trades. It is proposed to cater for approximately 400 full-time and approximately 900 part-time students. The course will extend over 2 years full-time and 3 years part-time.

" (d) *College of Science and Technology*—Maradana

It is proposed to make use of the present Laboratories and Workshops of the Ceylon Technical College that will be vacated by the Engineering Section when it shifts to Katubedde for the College of Science and Technology. It has been proposed to provide instruction at this College in 3 Departments, namely, Science, Engineering and Architecture. It would be possible to add on another Department of Applied Science to cater for the training of technologists in fields such as Applied Chemistry, Textiles, Ceramics, &c. Additional buildings, equipment and staff will be required for this project, the details of which have yet to be worked out. It is proposed that the College of Science and Technology will provide courses up to Degree and professional level in the fields of Engineering, Architecture, &c., with a practical bias that will distinguish it from an academic course as will be provided at an University.

" For this purpose it is proposed to explore the possibility of having ' Sandwich ' courses—a period in works and the rest at College alternately —which are now gaining in popularity abroad as a means of training technologists. The co-operation of the State enterprises, Government departments and private firms is essential for its success.

" (e) *College of Commerce,* Colombo (Maradana)

It is proposed to develop the Commerce Department of the Ceylon Technical College into a full-fledged College of Commerce providing a full range of courses up to professional and degree level and awarding its own Diplomas. New courses such as in Management and Insurance would be added to the existing courses which already include courses in Accountancy, Banking, Transport and Valuation at professional level and in Commerce at degree level besides the usual Certificate courses in Stenography, book-keeping, salesmanship, &c., which are at vocational level.

" (*f*) *Technical Teacher Trainee College,* Katubedde

With the setting up of the various Technical schools it is clear that large numbers of qualified teachers will be required to impart instruction at the various units. For this purpose it is proposed to have a teacher training college at Katubedde where those with industrial experience could be given pedagogical training. It is hoped to make use of the Workshops, &c., of the Institute of Practical Technology at Katubedde. Residential facilities will have to be provided for about 50 teacher trainees.

" (*g*) *School of Food Processing, Catering and Hotel Management,* Colombo

There are no facilities at all today in this field of employment and the deplorable state of our Restaurants, Hotels, Resthouses, &c., are evidence of the crying need for such an Institution. The details of numbers to be admitted, the courses to be provided, &c., have yet to be worked out.

" 2. *Training Units for Industrial Estates*

It is also suggested that provision be made in each industrial estate for a technical school at the same level as a provincial Junior Technical School. As it is meant primarily to serve the needs of the industrial estate to which it is attached it is not considered necessary to have all the sections as in a Junior Technical School. It is strongly suggested that *for the present* provision be made only for instruction in the basic trades in Metalwork and Woodwork. The workshops should be well equipped so that a certain amount of production work could be undertaken thereby giving the trainees the benefit of handling actual production jobs. The customers—those on the industrial estate in particular—will have the advantage of having small jobs turned out at nominal costs. This arrangement could be mutually advantageous to the trainee and the small industrialist. However, it must be stressed that the chief aim of the training unit is instruction not production which should only be subsidiary or incidental.

" The question of whether the School should be open to residents of the locality is one that could be decided later in accordance with the demands —but in the first instance it should provide for the needs of the industrial estate. There should be provision for both full-time and part-time classes —the latter being for those employed in the various units comprising the industrial estate either as apprentices or otherwise and who wish to improve themselves for future advancement.

"The standards of instruction will be up to the level of the proposed National Trades Certificate level."

At the moment the Planning Council's comment on this programme is that in general it should be given very high priority. It merely wishes to emphasise that in working out details of the courses, &c., there should be close collaboration between the Ministries of Industries and Education to see that the right balance of types of skills becomes available, e.g., given the present industrial programme to see that sufficient emphasis is given to training in chemistry and chemical engineering. It would also wish to point out that there should be close collaboration between the Technical College Department and industry, one aspect of which should be the development of a suitable system of part-time apprenticeship training.

SUPPLY OF AND MARKET FOR INDUSTRIAL FINANCE

While it is unusual, even exceptional for industrialisation to be held up *solely* because of lack of finance, it is nonetheless important to take steps to minimise the possibility of bottlenecks occurring in the supply of finance and to encourage the development of an efficient capital market. To the extent that public enterprise is expected to account for a large proportion of industrial investment a complete examination of this problem would involve a through examination of the question of Government financial policy as a whole. This is not possible here, attention being merely concentrated on those aspects of Government finance which have a direct bearing on industrial enterprise. Similarly only partial or incidental consideration is given to the aggregate process whereby a high ratio of savings and investment to national income may be achieved.

Problems of finance arise in different ways for, or have a different emphasis in, different types of enterprise. Hence it will here be convenient to examine the question at three different levels: for public industrial enterprises, for large-scale private enterprises and for medium-scale private enterprises. The needs of small-scale and cottage industries are considered separately in Section III of this chapter. As Professor Galbraith has pointed out in his report on "Industrial Organization and Economic Development" the basic realities of industrial enterprises are the same whether they are in private or in public hands. In general this is also true of their financial behaviour though there are some differences which call for somewhat different institutional arrangements.

There are a number of major types of finance which, in principle, are open to use by all types of industrial enterprise whatever their ownership and whatever their size. There are: subscribed capital, retained profits, bank credit, and trade and other short-term credit. It will be

27—J. N. R 2359 (6/59.)

convenient to examine each of these sources of funds from the point of view of the different types of industrial enterprises mentioned in the preceding paragraph.

Subscribed Capital.—By definition, in the first instance at least, the subscribed capital of a Government enterprise will be made available by the Government through the normal budgetary mechanism. Subsequent issue of subscribed capital may be of the same form or may take the form of issues of loan capital—debentures, &c., to the general public. Such issues pre-suppose the existence of an organized capital market. The establishment of large *new* private industrial firms poses difficult problems for financial organization even in the most advanced capital markets unless they are made under the auspices either of a large established private firm or the Government. There are usually no difficulties for issues by large *existing* private firms in well organized capital markets. The two preceding points apply to the large medium-sized firm except that the process may be not so easy to accomplish and the costs of making the issue will be relatively higher. For the smaller-type of firm it is usually both very difficult and very expensive to raise money on organized capital markets. It can usually only be done by some sort of private arrangement. The conclusion to be derived from this discussion is that if relatively large amounts of new subscribed capital are to be raised by Ceylon industrial firms it is indispensable that steps be taken to improve the efficiency and scope of the organized capital market.

Retained Profits.—Private firms normally finance a high proportion of their growth by retaining a share of their profits in the business. If the Government is going to take the initiative in industrial development and if it is to achieve a high rate of growth it must equally be the case, that Government industrial enterprises must also aim at achieving a high rate of profit retention. The instrument of Government policy in relation to private enterprises which can be most influential in this field is that of taxation policy. Already the Government does provide considerable incentives for profit retention by industrial firms through initial allowances, tax, holidays, &c., details of which are given in the National Planning Council's committee report on *Incentives to Private Investment.* To these must now be added the exclusion from wealth tax of investments in companies defined under sections 44c, 7A and 7B of the Income Tax Ordinance for the periods during which they are exempt from income tax.

Bank Credit and Trade Credit.—Any industrial firm requires substantial working capital. This can be financed from the firm's own resources but a substantial part of it, in countries with well developed credit systems, is usually financed by bank or trade credit, especially that part relating to the holding of stocks. Trade credit is probably reasonably well developed in Ceylon but, appearances to the contrary, is a very expensive form of obtaining credit. Bank credit is by no means sufficiently well developed particularly in relation to the smaller industrial concerns. There are at least two measures which would probably go a long way towards improving this situation, which would not only make for a more efficient banking system but which would also relieve the burdens on subscribed capital and retained profits which are at present required to finance working capital, freeing them for investment in expanding fixed capital. These are: first that banks should be required to extend their systems, or initiate them if they do not already exist, of island-wide branches, and secondly that the present reluctance of the banks to advance to small industrialists on the security of stocks be removed or minimised by the introduction of a system of insurance against bad debts raised on the security of stocks. This could be done by creating a new department of the Central Bank or setting up an entirely new institution.

In the previous paragraph it has been made clear that one of the major needs of Ceylon, if supplies of finance are not going to prove a bottleneck on development, is an efficient organized capital market. It must be recognized that to foster such an institution is a delicate task which needs action by the Government at a variety of levels. The basic point to realize is that it is a market—a process which takes places not necessarily or even likely in one physical place, whereby demands for securities by one group are matched by supplies of them by others. In the simplest terms measures must be taken, on the one hand to foster the supply of securities, and on the other to increase demands for them. One-sided action is sure to prove fruitless. Given the implementation of the industrial programme in particular and the Ten-Year Plan in general there is no need to feel that there will not be an adequate supply of securities wanting to come on to the market. What is wanted then are measures which will prompt investors to enter the market and which will provide them with the institutional arrangements which will facilitate the matching of supply with demand.

One important group of measures, which are not directly related to the industry programme but which are related indirectly through a variety of processes, and which are central to the establishment of an efficient capital market, relate to the fostering of a Government bond market. In the sense implied here no such market exists in Ceylon today. Virtually the whole of Government securities, especially in the case of new issues, are in the hands of institutions—banks, insurance companies, provident funds, Government departments, &c. While exchanges do take place between these holders there is in no sense an active market for them. The advantages of such an active market are far reaching but, for the most part are not susceptible to accurate measurement. On the one hand, in the context of this economy, it will probably be advisable that while bond yields are not fixed they should not be permitted to exhibit large short-term fluctuations. The responsibility of ensuring that this will be the case naturally will rest with the Central Bank. Its day-to-day operations in the market in order to achieve this aim will provide it with valuable data assisting it to diagnose the pulse of the economy. On the other hand, the initiation of a programme of new issues of securities which will be directed at the general public provides a useful technique for publicising the nature of the development programme. More important than this latter point, is the fact that if smaller private investors can be attracted into the bond market they are likely to become more familiar with the general processes of an organised capital market. The transition to investment into riskier private securities can be facilitated. Still more important is the possibility that the variety of measures involved in this process will influence propensities to save though it must be recognised that it is probable that this will only happen in the long run. Finally there is the fact that in the less specialised capital markets a reasonably active bond market, by the relative size of its turnover, provides a substantial amount of the bread-and-butter business of stock brokers.

This last point leads to a statement of another equally urgent need which is so obvious as to be self-evident but which nevertheless needs discussion—namely that encouragement must be given to the development of a stock exchange in Ceylon. Dealing in stocks and shares at the moment is in the stage through which most if not all stock exchanges elsewhere in the world have had to pass before they have reached maturity. The function of dealing in shares is a part-time activity of firms which have interests in other types of exchange transactions. Specialisation to share broking alone through the media of a stock exchange has yet to occur. Now this specialisation of function would be extremely difficult, if not in fact impossible, to create by legislation. In the past this specialisation has occurred and stock exchanges as such have been established when the volume of dealing in securities has been sufficiently large, for specialised brokers to be able to earn, or have expected to be able to earn a reasonable income from the relatively small rate of charges which they make on that turnover. Hence the best way to establish a stock exchange is to take measures which will result in a sufficient increase in bond and share dealing for it to become evident to the brokers themselves that it is in their interests to establish a separate exchange. If an exchange is established before that date the probability is that the quality of the services offered by brokers will deteriorate and the real purposes behind the establishment of an exchange will be hindered rather than helped. This should not be taken to mean however that the monetary authorities, notably the Central Bank should not be required to keep an eye on the practices employed by stock brokers to ensure that the position of trust which they necessarily have is not abused and the whole proceess of establishing an organised capital market delayed by losses of confidence by investors brought about by the sharp practices which can easily develop on the fringe, if nowhere else, of an immature share market. Here a further aid would be the implementation of a new Companies' Act along the lines suggested in the 1951 Royal Commission *Report on Company Law Amendments.*

These two steps—the establishment of an active bond market and of an active share market—are the basic requirements necessary to stimulate and canalise the flow of voluntary savings. To discuss all their implications and the steps necessary to encourage them is however a lengthy process. To follow them up here would on the one hand be out of place in a discussion of industrialisation as such and on the other would give an undue and undesirable prominence in that discussion to financial considerations. Furthermore, many of the issues are intimately related to the impact of the new system of expenditure, gift and wealth taxes the implications of which, from this point of view, have not yet been fully analysed. It is advisable then that the Planning Secretariat complete its investigations in this field before making detailed recommendations.

There is one further point that should, however, be made. This is that for certain types of firms, notably the smaller ones, steps taken to improve the efficiency of share dealing are largely irrelevant. For them, even granted an efficient stock exchange, the costs of entry to that exchange are too high. This is something which is not iniquitous but a reflection of a real situation namely that there is a limit to the size of the firm which is suitable for stock-exchange dealings though it is very difficult to put a precise figure on that limit. The consequences of this situation are that separate measures need to be taken to help meet the financial needs of the smaller firm. To some extent their needs have been met by the establishment of the Development Finance Corporation of Ceylon one of whose functions is to " nurse " such firms until they reach a sufficiently large size for them to be suitable entrants to the share market. When development gathers pace this is one area in which it is likely to be found necessary to extend its activities. This is also a field in which private " merchant banks " may well be permitted to grow.

In addition, however, there are other types of measure which can be adopted. One of these is to minimise the needs of small firms for fixed capital itself and hence for the need to finance it. This is, in effect, one function of the *Industrial estate* some details of which have been given in the National Planning Council committee's report on Incentives to Private Investment. One such industrial estate is at present being set up. Provision has been made in the Industrial Plan (see p. 351) for the finance of more such estates. No actual finance has been earmarked for this purpose after 1963 but this was done not because it was felt that there should not be a continuing process of setting up a considerable number of these estates in various parts of the Island, but because it was not thought necessary at this stage to attempt to put a specific limit on the amount to be spent. It may well be the case that it will be found advisable to increase substantially the rate of spending on these estates in the later years of the Ten-Year Plan.

One other financial technique can be of considerable use to smaller firms. This is to take steps to minimise their *initial* capital requirements. This can be done by setting up, or permitting the setting up by private firms, of institutions to provide hire purchase facilities for the purchase of industrial equipment. The one objection to this is that it can be an expensive process. To this there are in principle two answers. First that, while it may be expensive, it may still provide opportunities for the borrowers to use it and still make substantial profits. Secondly the cost of the service will depend partly on the efficiency of the service—which in turn will partly depend on the scale on which it is done. If, for instance, branch banking is expanded, as is recommended elsewhere, it may be possible for commercial banks to combine the advantages of their being relatively large units with the knowledge of financial standing which they acquire in the normal course of their banking business, and as a result produce a relatively cheap service. Presumably it is this type of situation which has led recently to the entry of commercial banks into the hire purchase business in the United Kingdom and in Australia. Furthermore it would be possible for the Central Bank to set up a hire purchase department the aim of which would not so much be to canvass business but to act as a potential competitor by being willing to offer rates which would set a standard for other types of institutions.

FOREIGN INVESTMENT

The aim of Ceylon should be not merely to industrialize but to industrialize as rapidly as possible. If it is agreed that this is the case then the government and the people of Ceylon ought to be prepared to accept the logical implications of this objective—in particular, in the context of this argument they should revise their attitudes towards foreign investment. It has been pointed out already that Ceylon will encounter difficulties in its industrialisation programme, through lack of capital resources, lack of management experience and lack of technical skills. Private foreign investment provides a simultaneous solution or at least partial solution to each of these problems. A form of enterprise which does these three things at once merits very serious consideration indeed. Admittedly there are drawbacks—namely a continuing drain on foreign exchange earnings with, perhaps larger commitments at a later date for capital repayment; the closing down for a period of years of potential openings for Ceylonese in the ranks of the higher technical and executive personnel; and the retention in foreign hands of control over what may be relatively important economic decisions.

To a very large extent these drawbacks are illusory. It will be most improbable, in most of the industrial fields in which private foreign investment is likely to be interested in Ceylon, that the foreign exchange costs of foreign investment will exceed its foreign exchange earnings either in initial capital investment or in earnings or savings over time. Secondly, for a very large number of potential foreign investments the alternative is not a job for a Ceylonese versus a job for a foreigner but a job for a foreigner or no similar job at all. Further if there is a job for the highly-skilled foreigner there will be a relatively large number of jobs for the less-skilled Ceylonese. There is the additional point that in the longer run there will be more jobs for even highly-skilled Ceylonese more quickly than would otherwise be the case, the sooner private foreign investment is positively encouraged to enter Ceylon. As for the vexed question of control the sooner it is realised that the major centres of economic control are already in Ceylonese hands the better. Indeed, it is recognition of this fact, together with doubts as to the wisdom with which these controls will be used, that is probably the main deterrent towards private foreign investment at the moment.

If foreign investment is to be encouraged a variety of measures is required. As a minimum there must be "political" guarantees—i.e., that there will not be unwarranted nationalisation of private foreign enterprise, that in those cases where it might become politically desirable that nationalisation should take place there should be no doubts about the adequacy of capital repayment or its convertibility into foreign exchange and that there should be no restrictions on the remittance abroad of profits which represent reasonable rates of return on investment. These political guarantees can take a variety of forms all of which can be pursued simultaneously if required—government statements of policy, inter-governmental agreements and private agreements with particular foreign investors.

Political guarantees are, however, not enough. Foreign investors look also at the political and social stability of the countries in which they propose to invest. More particularly they look at the economic policy of the country and the degree to which that policy is successfully implemented. There are two areas of economic policy that are of particular interest—general budgetary policy which indicates the degree of inflation to be expected and wages policy, which is, of course, not unrelated to the former, and which will indicate to the foreign investor its possible strengths and weaknesses in its bargaining position in relation to labour. A country, whose economic policy indicates an awareness of the issues involved and a willingness to make a determined effort to solve them, is naturally more likely to be favoured by private foreign investment than otherwise.

There are also more specific incentives. Sharp differential duties on assembled as against unassembled products may make it difficult for the foreign investor not to set up an assembly plant in the Island if he wishes to maintain or expand his share of the market. More generally the establishment of a relatively high protective tariff makes it much more likely that present foreign suppliers of imports will have incentives to set up domestic establishments, either by themselves or in partnership with their Ceylonese distributors. In order, both to reduce costs for foreign firms and to provide incentives for the higher executive and technical personnel without whose services foreign private investment is impossible, it would be advisable to grant such employees the right to be free from Ceylon income, expenditure taxes, &c., for a specified period of years. This is all the more the necessary because India one of Ceylon's major competitors for both foreign investment and foreign skills has granted privileges of this type.

In this context it must be made clear that it is not being argued here that industrialisation is impossible without foreign investment. That is certainly not true. It is, however, undoubtedly the case that industrialisation will occur *at a faster rate* if investment is encouraged by private foreign industry. Both the government and the people generally need to be clear that by not positively encouraging foreign investment they are making a choice that involves the acceptance of a slower rate of growth.

MORALE

There is one final point to be mentioned. There is no doubt that to date, with certain honourable exceptions, private enterprise has not taken vigorous steps towards industrialisation. It is also the case that so far government industrial enterprises, once again with honourable exceptions, have not been particularly successful. It is essential that this experience should be kept in its correct perspective. It would, for instance, be fatal to the whole success of the industrial programme if the view prevalent even in some responsible quarters, that Ceylon and its people are inherently incapable of industrialisation is allowed to continue to influence the implementation of policy. The present successful performance of some private and government industrial enterprises is, of course, a sufficient contradiction of the general argument. The morale of their success is and should be "It can be done". The aim of policy should be to see that the conditions realised in these examples become the rule and not the exception. Beyond this what is needed at the moment is a certain element of faith in the probability of a successful achievement of industrialisation in Ceylon. This need not, and should not, be a matter of blind faith—simply belief that in spite of the many obvious difficulties there is no inherent reason, given vigorous pursuit of the aim, why Ceylon should not be able at a relatively early date to be successful in achieving a reasonably high degree of industrialisation. One reason for the relative failure to date has been a failure of morale. It must be the aim of government policy to build up that morale. This can be achieved in the first instance by saying (not half-heartedly) that "it can be done" and in the second instance by showing by performance that it is being done.

Part III—Small-Scale & Cottage Industries

The industrial programme described in section I of this chapter is concerned primarily with large scale and medium sized industry. It is also necessary to plan for the development of small-scale industry. This is all the more so because, while ultimate hopes of a high degree of industrialisation in Ceylon hinge largely on the kind of industries discussed in section I, the short-term benefits, particularly in terms of the creation of employment opportunities, are rather limited in such industries. Elsewhere the urgency of the need to create new jobs has been emphasised. It is all the more necessary then, as part of an over-all plan of industrial development, to invest substantial sums in types of enterprise which require a relatively small investment per man and in which it is consequently possible to employ far greater numbers for the investment of any given sum. This potentiality exists in the field of small-scale and cottage industries.

RECENT DEVELOPMENTS IN POLICY

To exploit fully the opportunities in this field will require a somewhat different emphasis from what has been the experience in the past. Up till fairly recently emphasis has been on *cottage* industries, an emphasis which carries overtones of " arti-craftiness " and which has been thought of in terms of relieving rural unemployment rather than as a positive source of industrial advance. This approach has not had particularly satisfying results and has increasingly given way to new ways of tackling the general problem. The new direction which thinking is taking in this field and an account of some of the areas in which a new approach is being adopted is contained in the following extracts from the latest (1957) *Administration Report of the Director of Rural Development and Cottage Industries :*

" A critical examination over the past few years of the problems to be faced in developing cottage industries extensively indicates that the only manner in which cottage industries can be successfully organized for economic production is by the introduction of labour-saving devices.

" Let us examine the position. If we avoid thinking in terms of cottage industrial methods as a kind of social service and concentrate on the possibilities of its economic establishment, there are certain matters which stand out :—

(i) the very small internal market in Ceylon which tends to boost up the price of an article,

(ii) the variety of demand,

(iii) the preference of people generally for a foreign article on account of Ceylon produce has yet no name for manufactures of a high standard,

(iv) the existence of a big neighbour with a large consumer population and with high skills possessing raw material in abundance at a very much lower cost and producing more or less the same article.

" The only manner in which these disadvantages can be offset is by the introduction of labour-saving devices into manufacturing procedures. Labour-saving devices can be introduced into 2 aspects of production :—

(i) for the process of conversion of a raw material into a finished product,

(ii) for processing and making available cheap raw materials for subsequent use by cottage craftsmen.

Unfortunately, however, in today's context the installation of labour-saving devices presumes the availability of power. The situation in this connection in Ceylon is hardly satisfactory from the point of view of industrialisation. Power, at present, is available only in the main towns, and, even there, is not available adequately and cheaply. The result is that the organization of manufacturing processes in rural areas, by the incorporation of labour-saving devices in homes or in small units, is almost impossible at present. There is at present talk of rural electrification, but this has not become an accomplished fact yet. Concentration of these methods, therefore, will inevitably have to be in urban areas, very often remote, from the sources of raw material. A good example is Pottery. It is rarely that we find electricity in close proximity to an extensive clayfield. This Department was hard put to it to find half a dozen centres where such facilities exist. The alternative then is to link rural cottage industry, for its requirements of raw materials, either in a processed state or a semi-processed state, to big industrial concerns or small-scale industrial units established in the areas where power is readily available and to make available these processed or semi-processed raw materials cheaply to cottage industrial workers in the areas which do not have the advantage of power.

" Examination of industries from this angle was done in respect of the following industries :—

Textiles
Coir
Carpentry
Pottery
Brickwork
Rattan and basketry
Smithywork.

"In the case of textiles the situation that existed was of a very large number of Handloom Centres working entirely on rudimentary methods in all its processes of manufacture at small rural Centres. With the establishment of the first Powerloom Project at Kandy and with the beginnings of installation of the Second Powerloom Project in Chilaw and the conversion of a mechanised private workshop at Balapitiya into a Co-operative Society, the procedures are being changed. The present policy is for all Preparatory and Finishing processes to be done by handloom. It is hoped to convert, at the end of 1959, all the handlooms in the main producing districts, that is, Colombo, Kandy, Puttalam, Kurunegala, Matale, Nuwara Eliya, Ratnapura, Kegalla, Kalutara, Galle, Matara and a part of Hambantota into this scheme. The first steps of training, both Demonstrators and Workers, have been taken and at the moment about 400 looms have been converted to this system. The effect has been that a sarong that was produced at Rs. 9 for the market is now being made available at Rs. 6.25. There is also the possibility of diversifying production. The advantages are also that the qualities are much more satisfactory than were in the past. This step was taken with a certain amount of trepidation but its inevitableness expedited work. It was, therefore, most encouraging to read in one of the recent issues of the Indian "Handloom Journal" that technical studies have disclosed that this is the most practical method of reducing cost of production. The following quotation is interesting:

> "If the production of the common wearing apparel must be left to the handlooms and the industry placed on a suitable commercial footing then the handlooms should operate as composite units comprising of power spinning-cum-power warp preparation-cum-handloom weaving. Once the industry is organised on its production aspect there will be no need to subsidise the sale of handloom cloth".

"Coir presents slightly different problems, and, in this case, the organization of the raw material is entirely on a cottage industrial pattern. The procedure followed is to establish mechanised workshops for the consumption of yarn as a first stage. Two Mechanised Workshops and a Finishing Plant are being established in 1958, and it is hoped to increase this by 4 more next year. Thereafter, plans are being finalised for the establishment of a powerloom coir installation. This will take about 2 years more. In the meantime, experimentation is being done on the techniques of beating and spinning and the evolution of suitable machines for this purpose. The results of the experiments have so far been most encouraging. Machines have been evolved and it is only the finer adjustments that are being finalised. A full-scale organization of the Coir Belt in this pattern is bound to change methods and procedures considerably. The lot of the coir producer and spinner on a cottage scale as a result of the use of mechanical devices will improve and have the natural result in an increase of their incomes. It is worth mentioning that this is the one industry in Ceylon in which standards of manufacture already rate to world class though the methods used are the crudest. The drawback has been exploitation at various levels resulting in low incomes. The problem here is extension of production and reorganization of the cottage industrial part of it to ensure that the fruits of the labour of the craftsmen will go to craftsmen.

" The subject of pottery is a little more difficult. The bulk of the pottery produced in the country consists of traditional articles for domestic use such as pots, pans, &c. In the production of these, the techniques adopted are as good as those anywhere else, for example, in India, where this type of pottery is used, but the marketing prospects are diminishing as a result of alternatives like aluminium-ware, &c., being cheaply and readily available. For manufactures of this type, from a technical angle, there is very little that this Department can teach the traditional craftsmen and all the action that is taken is to organise them into Co-operative Societies for better marketing purposes and to help these groups to obtain their raw materials facilely. The development of this industry has consisted of experimentation with glazed ware and the mechanisation of this aspect of the industry. The qualities required are such that crude methods cannot produce articles of class. For the production of articles of class, mechanisation is inevitable since it involves the preparation of glazes and compounds and proper burning. Unfortunately, as mentioned earlier, in most of the areas where electrity—which is a sine qua non for such work—is available, there is no tradition of industry. The result is that Centres had to be selected where both these facilities exist and such sites are very few and far between. An examination of the availability of both facilities throughout the Island so far has disclosed only 6 centres that are suitable and in these centres equipment is being installed and electric kilns, &c., the being provided. These Centres also will produce secondary raw materials in bulk for distribution to Centres where such equipment cannot be installed on account of a lack of power. The Centres selected have been Nittambuwa, Weligama, Ambalangoda, Ambalamulla, Waragoda and Dediyawela. Further investigations are being made in other areas.

" A recent development was the discovery of and the successful processing, on a cottage scale, of clays from certain areas which approached porcelain standards. If these experiments are successful it opens the range for the manufacture in Ceylon of a large range of articles at present imported in which porcelain of a very high quality is unnecessary. Such range would include sanitary-ware and fittings, electrical equipment, &c. No industry can base its development entirely on artline ware and the realisation of this has forced investigations of this nature. It is possible to go in for low-quality low-priced crockery-ware also which constitutes the bulk demand among the middle and lower income groups in Ceylon.

" The brick-making industry is one that is done on the most rudimentary fashion. In fact the disparity of the advancement in tile-making processes, which in many cases have been fully mechanised, when compared with the brick-making processes, is one that strikes the eye immediately. Since bricks will be of continuous demand, it is felt that the utilisation of machinery for this purpose will produce more bricks and cheaper bricks. The trouble, of course, is in the availability of power in the areas of the clayfields. Pilot projects are proposed for the current year where 2 units at Colombo and Kadugannawa and 2 portable brick-making units to work particularly in areas where there is no power, but where there is a large demand as in the colonisation schemes, are proposed.

" Rattan and basketry are traditional industries but here full exploitation has not been possible because methods and manufacture are of the crudest form. Here too if this industry is to exist, low-cost raw materials will have to be provided. The first semi-mechanised institution of this nature is to be opened this year, with the assistance of equipment and technical personnel form the Japanese Government, in Mawilmada in Kandy. The proposal is that in this institution bamboo-work, bata-work and rattan-work should be developed not only as a manufacturing industry in itself but that the Work-shop should have the capacity to provide processed raw materials to cottage craftsmen. A typical example would be the outer cane necessary for weaving the seats and backs of chairs. At the moment curing and splitting is done in the crudest way with a large expense of labour, and, therefore, at a high cost. The weaving, except in the furniture manufactories, is on a cottage scale but the high cost of production of a semi-processed raw material makes the venture barely economic. From the Centre that is proposed to be established at Mawilmade, it is hoped to provide such articles in great bulk for sale to cottage craftsmen, so that a higher margin of earnings can be obtained.

" Carpentry is another industry in which old traditional methods will have to be changed if precise and remunerative work is to result. With the advice of Mr. Heaft, an Expert in Carpentry under the Colombo Plan from the Australian Government, it is proposed, in the course of the year, to establish 30 semi-mechanised Training Schools for training lads in the urban areas in carpentry and 1 fully mechanised institute in Velona in Moratuwa. Small-scale equipment for the schools have already been obtained and the Demonstrator staff of the Department trained in the use of this equipment. The Australian Government has offered 25 sets of semi-mechanised equipment under the Colombo Plan Aid Scheme for installation in the schools. Five Centres have already been started. It is hoped that the Carpentry Societies in the Island will, wherever electricity is available, obtain small and large-scale equipment on the pattern available in the semi-mechanised schools and for heavy work those that will be available in the major carpentry institution to be established in Velona. This should have the result of reducing the cost of production by the employment of labour-saving devices by as much as 25 per cent. on the manufacturing cost and help also to increase the wages for the industry. All these establishments will be treated both as training and manufacturing institutions and should have a direct capacity for manufacturing about 2½ million rupees worth of carpentry goods of quality at very much cheaper rates than are now available. They should also pay their way. This is one of the industries in which considerable progress is being made.

"The Smithy Industry is also one that lends itself to this treatment. One of the advantages in this industry is that the source of raw material is largely railway spring steel which is available in abundance. This steel which is suitable for conversion to small agricultural implements such as katties, pruning knives, kitchen knives, digging forks, alavangoes, mammoties, &c., is available fairly freely though unfortunately the Railway Department has increased the price from Rs. 95 to Rs. 212 per ton. In view of the fact that this raw material has no use within the railway, and if let out into the open market will be exported, it seems appropriate that it should be utilized for cottage industrial purposes exclusively. Even now the agricultural equipment made by village smiths and smithy societies are almost of the same standard as that of the imported ones and all of them work not through Government protected buying schemes but through their own marketing resources. The time, I think, is come to ban the imports of articles of this nature. Since it is important that such ban should not work adversely to the consumers of this type of equipment, some kind of stock-piling at the start will be inevitable, which means an expenditure of Government capital but the results will be fully worth it. A simple process by which the cost of production can be reduced is by the installation of a hydraulic press, preferably by the Railway Department itself, whereby, instead of the spring steel being issued in its present form it could be made available in widths of various standard sizes so that the labour expenditure on thinning down the steel, which is, the most expensive process, can be reduced to a minimum. This matter is being followed with the Railway Department.

"It will be seen that wherever a potential for economic development of industry exists, it has become necessary to link it on to major mechanization of small-scale mechanization manufacturing units. This pattern is inevitable on account of the reasons given earlier and it is the only means by which cottage industries can be stabilized on an economic basis."

THE IMMEDIATE PROGRAMME

The likely benefits from this approach to the problems of small-scale and cottage industralisation are indicated by the following summary of the expected results on completion, of the various schemes at present in hand by the Cottage Industries Department :—

TABLE XII

Immediate Programme Cottage Industries

Industry	*Completion Dates*	*No. of Units*	*Investment (Rs. '000)*	*Employment*	
				Direct	*Indirect*
Handlooms	1955–1959	1,000	2,200	25,000	?
Art textiles	1958–	3	730	500	—
Power looms	1955–1963	6	7,900	2,000	?
Coir weaving	1957–	10	750	300	1,000
Coir power looms	1959–	1	4,000	300	4,500
Bricks	1960–	4	145	80	—
Mats and leather	1959–1963	6	330	600	1,200
Dolls	1958–1960	14	220	250	?
Pottery	1958–	4	410	150	?
Bamboo	1958–	1	50	25	?
Woodworking schools	1957–1959	25	625	210	—
Woodworking workshops	1958–1959	1	330	20	—
Danture gold and silver	1958–1959	1	50	40	200
Total			17,740	29,475	6,900 + ?

Note.—The handlooms scheme represents the balance of capital expenditure to be incurred—not the total.

From the excerpts from the Cottage Industries Report it is apparent that, just as in the case of large scale industry, a good deal of detailed technical research is necessary before it is feasible to accept any particular line of Development as being a sound one to pursue. Small-scale industries also require that a good deal of time be spent in organising technical training facilities. Close inter-relationship has to be developed with other departments—notably the Electricity Department—in order to achieve the full potentialities of the available knowledge and skills. It is also apparent that in a number of important fields this preparatory work has either been done or is well on the way towards completion. What is now required is partly a change of emphasis, partly new administrative arrangements and, last but not least, the expenditure of really substantial sums on investment in small-scale industry.

THE TEN-YEAR TARGET

It is against this background that the National Planning Council recommends that the investment target for small-scale and cottage industries should be Rs. 400 million over the ten-year plan period. The tentative phasing of this investment is as indicated in Table II.

TABLE XIII

Small Scale and Cottage Industries—Planned Investment Expenditure (1959–68)

Year	*Amount (Rs. M)*
1959	5
1960	10
1961	20
1962	30
1963	45
1964	50
1965	60
1966	60
1967	60
1968	60
Total 1959–68	400

Note.—This is a capital budget and does not take into account, current account payments on behalf of the Department or Board.

After an initial period of " tooling-up " in the sense of expanding research, training facilities, &c., it is intended that a period of sustained investment should take place at a level which should promise major advances in incomes, employment and output.

A NEW APPROACH TO SMALL SCALE AND COTTAGE INDUSTRIES

One of the reasons behind the thinking which led to a programme on this scale was the recognition of the fact that, in the context of the economy of Ceylon, it is capital rather than labour which is the scarce factor of production. The proposed Rs. 400 million investment was thought of largely in these terms, i.e., as on investment in labour intensive industries which would earn large returns in terms of output and employment. It would however, given the factor proportions in Ceylon, be a false economy to regard this investment as for practical purposes a free good and expect no return on the capital employed. It is necessary to aim, in a large proportion of the proposed uses of that capital, to plan for at least a moderate rate of return.

If it should be accepted that the aim of policy should be to obtain a return on the investment there are two important consequences of this decision which need to be examined : first, the contribution to the financing of the programme which would stem from such a decision ; and secondly, the implications which it has for the administrative organisation of the small-scale and cottage industries sector. The two questions are interrelated and it will be convenient to consider some aspects of the second one before looking at the financial implications in more detail. What is visualised (details will be given shortly) is an organisation which will earn income on some proportion at least of the capital funds made available to it ; which will be the recepient of regular repayments of moneys loaned by it ; and which will be making payments for the construction of a continuing stream of small industrial establishment. In these circumstances it would probably make for both business and administrative efficiency if the organisation took the form a statutory body—say the Small-scale and Cottage Industries Development Board. Like any statutory corporation its general policy would be the subject of cabinet decision, its capital requirements would, in part at least, be subject to normal budgetary procedures and its efficiency of operation a matter for periodic parliamentary review.

The potentialities that such a body would have for financing its own programme, or alternatively for providing for an expansion of that programme out of its own resources are indicated in Table III. This table shows the alternative amounts which would accrue if all outstanding investments earned a given rate of interest and if one half of the total investment was subject to annual repayments of one tenth of the capital value of the initial investment. The phasing and volume of the investment expenditure is that given in Table II. On these assumptions by 1969 42 per cent. of the investment programme could be financed out of the yield on investment plus repayments assuming an interest rate of 2 per cent. The proportion

TABLE XIV

Small Scale and Cottage Industries—Potential Financial Surpluses 1960–69

	Average Yield on Investment at		
Year	2 *Per cent.*	4 *Per cent.* *(Million Rupees)*	6 *Per cent.*
1960	·3	·4	·5
1961	1·0	1·3	1·6
1962	2·4	3·1	3·7
1963	3·4	4·6	5·7
1964	6·5	8·5	10·5
1965	9·8	12·6	15·4
1966	13·8	21·6	21·4
1967	17·7	22·4	27·1
1968	21·6	27·2	32·8
1969	25·4	31·8	38·2

financed in the same year would rise to 64 per cent. if earnings could be realised at the rate of 6 per cent. If a higher proportion of investment than one half were subject to repayments still higher proportions could be financed—the limit, given the particular pattern of expenditure of Table I, being 74 per cent. with 2 per cent. earnings and 95 per cent. with 6 per cent. earnings on the assumption that all investment was subject to repayment. While these estimates, particularly the latter, are theoretical limits it should be obvious that the possibilities of financing a considerable part of the small-scale and cottage industries investment programme from within itself are substantial and perfectly feasible.

It is now time to describe in more detail the functions and methods of operation of the proposed new Small-scale and Cottage Industries Development Board. It is hoped that it will be apparent, as it is in fact the case, that these functions are either merely a continuation of existing practices or a logical development out of them, made possible by the increase in scale of operations that is visualised for the new board. As far as possible these functions will be described in logical sequence.

The functions of the proposed new Board would be :—

(i) *Research and Technical Advice.*—As is evident from the Administrative Report on Cottage Industries quoted earlier a soundly based programme can only be developed after careful examination of the needs of particular industries. Given the proposed scale of the new programme, existing research facilities must be expanded and still greater use made of the technical aid which is already being made available through the United Nations, the Colombo Plan and similar agencies.

(ii) *Training.*—While by definition, the new capital equipment which it is intended should be made available is suitable for small scale industries, it is still the case that skills in using that equipment have to be taught. Hence adequate attention needs to be given to the provision of training facilities.

(iii) *Supply of Capital Equipment.*—It is not sufficient simply to train workers in the new skills. It is necessary to have an integrated programme for the purchase and setting up of equipment, the uses of which have been learnt under the training programme. It is here that, once the programme is established, the bulk of expenditure may be expected to occur. One of the incidental advantages of the proposed programme is that the factory buildings involved and the equipment required for them are on a small-scale and it should be well within the means of small local contractors to undertake their construction. In this way there are good prospects for increasing the rate of development of the local contracting industry which should be of value well beyond the particular sector which has fostered its growth.

(iv) *Finance of Small-scale Industries.*—As it is obvious that the people who will be trained to operate the new factories and workshops will not have the capital necessary to be able to purchase their new work places, steps have to be taken to enable them to do so. As visualised here the actual construction or finance of that construction will be borne by the Board. It is, of course possible that it retain ownership and simply retain the newly trained workers as employees. Alternatively and preferably it could arrange for the formation of working partnerships or co-operatives which could either lease the equipment or buildings or arrange for repayment, at low rates of interest over a period of say ten years. It is this latter type of arrangement, the details of which could vary from industry to industry, which provides the justification for the financial exercises in Table XIV.

(v) *Bulk purchasing and the Establishment of Central Stores.*—Throughout this scheme lies the assumption that its central aim should be to provide "economic" production, i.e., a balance of purchases and sales without (or at worst with minor) subsidies, and production of products of reasonable standards of quality and as cheaply as possible. One method of meeting this last mentioned requirement is to combine, as far as is practicable, economies of scale with small productive units. One way in which this can be done is to see that productive units in a particular industry are standardised, that there are bulk purchases of replacement parts, tools, &c., and that there are central warehouses where adequate stocks of these can be maintained so that there are no undue delays when breakages and break-downs occur. Another method is to adopt bulk purchases of raw materials which, for the industries under review, can represent a high proportion of the total capital employed at any particular time. The bulk purchase of raw cotton is for example a likely field for this sort of practice. Here incidentally, if domestic spinning and weaving develops on a substantial scale, may be found an important bargaining counter for the strengthening of tea sales in the cotton growing markets of the Middle East.

(vi) *Marketing.*—It is not sufficient to produce commodities, they must be sold. Too often this simple fact is neglected in schemes for the development of small scale and cottage industries. In the context of Ceylon this means that a variety of measures need to be taken. First the quality of the products produced must be as high as possible. Secondly, given a reasonable degree of success in attaining this end, consumers must be educated to accept the fact that the purchase of goods "Made in Ceylon" is not an occasion for the enjoyment of self-satisfaction because of the sacrifices they believe themselves to have made by purchasing such products. Thirdly economies of scale must be sought in organising a net-work of wholesale establishment and perhaps chains of retail shops. Finally some vigorous selling must be employed at the retail end. Small scale cottage industries must obtain reasonable sites (the recently vacated Whiteaways site is one much more suitable for retail selling than government offices) and employ those sites not only to make displays which will attract the eye of the passing tourist but also the eye—and the pocket—of the local inhabitants. The essential point is that it must be realised that what is proposed is large scale production—albeit by small scale units—and that this means, if the output is to be sold at reasonable prices, that there must also be changes in the traditional habits and organisation of retail selling.

(vii) *Co-ordination of Policy.*—Now that it is recommended that there should be a far greater flow of investment resources into the small scale and cottage industries sector, care must be taken to ensure that there is co-ordination of policy between the Ministries of Industries and of Home Affairs. Because of the links of the present department with community self-help schemes and with the co-operative society movement it may be advisable to continue the present linking of these activities with the small scale cottage industries board. At a variety of levels, however, the needs of small-scale and large scale industry over-lap—in the need for research, in the provision of training facilities and in the need for joint market surveys of, and joint division of, the market between the possibly, indeed probably, competing output of the two types of industry. It is essential that both types of activity be co-ordinated, partly to ensure that there is no unnecessary duplication of facilities, &c., partly to ensure that there is a common policy for what are essentially two parts of the same process.

(viii) *Financial Organisation.*— One advantage of setting up a statutory board would be to give the authorities concerned with the development of small scale and cottage industries greater scope for raising finance. As has already been indicated in addition to relying on budgetary grants it could raise a large proportion of its funds from internal resources. In addition it could be given powers to raise domestic loans. It could also well become a useful medium for adding to foreign exchange supplies by negotiating on its own behalf for foreign loans with which to finance the foreign exchange content of its capital equipment purchases. This greater freedom from financial considerations plus its ability to avoid normal governmental current financing practices would increase its chances of operating successfully as a semi-business unit. It must be emphasised however, that it should not be thought of as primarily a profit making venture. Its direct revenues, such as they would be, are thought of as rents and interest rather than profits. Its intention should be to create small-scale units rather than to operate them as going concerns. In this respect the board should be thought of as a small scale industry industrial promotion corporation similar to that discussed in Part II except that that idea is here adapted to the needs of small scale industry.

POTENTIALITIES OF THE PLAN

Some indication was given in Table XII of the immediate potentialities of an enlarged programme of development of small scale and cottage industries. This, however, is only an indication. In terms of the fields at present being exploited no account has been taken of the opportunities that will be opened up simply, for instance, as a result of the housing programme, in the fields of brick production, carpentry, mat weaving and furnishing. In addition there are a variety of fields suitable for small scale and cottage industries which have not yet been consciously planned. The potentialities in this field are wide as is indicated in the 1956 U. N. Technical Assistance Programme report on *Development of Small-scale Industries in Ceylon*, which still serves as a useful guide to the directions in which future development should take place. There is no doubt that the target of Rs. 400 million over ten years is not too ambitious in view of the technical possibilities for the use of small-scale techniques which are already known. Given suitable administrative arrangements, careful co-ordination and vigorous implementation there is no doubt that small-scale and cottage industries can play a vital part in the general expansion of output, incomes and employment and in the savings of imports which are the aims of the industry programme as a whole and indeed of the entire Ten-Year Plan.

APPENDIX I

Assumptions behind Tables V and VI. Industry Plan Projections

Table V

Gross Value of Output : For the specific projects included in the Plan the expected gross value of output was calculated for each project on the basis of the planned operating data available to the Planning Secretariat. For new projects a ratio of 1·25 fixed capital expenditure lagged two years was used. This ratio was derived on the assumption that for the projects concerned the capital net output ratio was 2 : 1 and that net output was 40 per cent. of gross output.

Gross Profit : It was assumed that the gross profit margin would be 25 per cent. of the value of gross output. Cf. *Census of Industry 1952*, p. 17, where gross profit was 26·1 per cent. of gross value of industrial output.

Foreign Exchange Capital Costs : For those projects for which detailed estimates are available their individual expected foreign capital costs have been used. For ' new projects ' it was assumed that 60 per cent. of total fixed capital costs would represent the cost of overseas purchases.

Import Savings : For existing projects individual calculations of net import savings (i.e., value of output c.i.f. less foreign operating costs) were made. Over the ten-year period these calculations indicated that import savings were 42 per cent. of realized fixed capital expenditure. On the assumption that ' new projects ' would be likely to be less import saving than investment in such industries as cement, sugar, fertilisers, a ratio of 25 per cent. was applied to the capital expenditure series for ' new projects ' lagged two years.

Additional Demand for Industrial Imports of Consumer and Intermediate Goods : This is derived by fitting a straight line trend to the estimates of imports in 1957 and 1968 which was calculated when preparing the overall physical and financial balances described in Chapter II. It takes into account expected population increases and some increase in real incomes per head.

Operational Employment : For existing projects—namely, capital intensive ones—amounting to about Rs. 800 million capital expenditure, average investment per man employed is Rs. 40,000. It has been assumed that the bulk of remaining expenditure will be on much less capital intensive projects, i.e., that average expenditure per man will be of the order of Rs. 10,000. On this basis the remainder of the employment was calculated on the basis of ' new project ' capital expenditure agged two years.

Power Requirements : The power capacity requirements of individual projects for which suitable data were available were aggregated. The power demand of these projects was related to the capital expenditure on them. This gave a ratio of power demand to industrial capital expenditure of M. W. 45/640 per Rs. 1 million capital expenditure. This ratio appeared reasonable because on the one hand the admitted fairly high power demand of some projects was balanced on the other hand by large expenditures on other projects (e.g., sugar) which, for the purpose of this calculation were assumed to be self-sufficient for electric power and hence would make no demands on the general electricity supply system. The above ratio was applied to the ' new projects ' capital expenditure series lagged two years. In all these calculations the highly power intensive fertiliser factory was excluded. It has simply been added to the total derived from the above calculations.

Unit energy demands were obtained by taking the expected demands of the fertiliser plan separately and adding to it the demand for other industry which was estimated by applying a 50 per cent. load factor to the capacity requirements as estimated above.

These calculations exclude the possible electricity demands of the rubber tyre and tube factory, the steel rolling mill, the integrated steel smelting plant and the oil refinery.

Table VI

Depreciation : Rates of depreciation were estimated on the assumption that a 5 per cent. rate should be applied to buildings, 10 per cent. to plant and machinery. Capital expenditure was assumed to consist of 45 per cent. buildings, 55 per cent. plant, &c. (Cf. Australia where the proportions on the period 1949–56 were 43 : 57). These assumptions result in an average rate of depreciation of 7·75 per cent.

Existing capital stock is estimated on the basis of the returns in the *Census of Industry 1952* after allowing for increased investment between 1952 and 1958.

Dividends : These have been estimated assuming a rate of 10 per cent. on the cumulative capital expenditure in the unplanned sector lagged two years.

Potential Gross Savings : These are " potential " because it is assumed that corporation income tax (both public and private) is reinvested in industry.

Gross Savings on Existing Investment : This estimate is based on data available in the *Census of Industry* 1952. It is equal to gross profit less corporate income tax and dividends and less consumption expenditure and income tax of unincorporated firms.

CHAPTER 9

ELECTRIC POWER SUPPLY

POWER FOR DEVELOPMENT

IT has been accepted elsewhere in this report that industrialisation at as rapid a rate as possible is necessary for the stability and well being of the economy of Ceylon over the next decade. This implies—as a necessary corollary—that there should be sufficient power supplies available to permit the implimentation of the industrial programme. In the *First Interim Report* of the National Planning Council there was a careful discussion of the general conditions affecting the electric supply and demand situation in Ceylon and estimates of likely future changes, in it. Since that report was written however the over-all plan for the economy has taken detailed shape and in particular there are now firm estimates of the desired levels of expenditure on industrial investment. This has meant that, while the discussion in the *First Interim Report* of general principles about electricity supply in Ceylon still stands and is taken for granted in this discussion, a re-appraisal has become necessary of the detailed inter-relationship of supply and demand over the next ten years.

EXPECTED DEMAND FOR POWER

The first step in any such re-appraisal is to examine the demand situation as it now appears in the light of proposals included in the Ten-Year Plan. As was made clear in the *First Interim Report* (pp. 145-154) any such estimate of demand is subject to a considerable margin of error, the margin of error increasing as the period of time lengthens. In the light of the data then available it was only possible in the *First Interim Report* (p. 120) to make an estimate for the period under discussion by assuming a straight line trend in demand derived from recent past experience. For certain sectors of demand this procedure has also been adopted in the present forecast. Given the industrial programme, however, it has been possible to make an independent estimate of the demand for power by this sector. Largely because the rate of growth of industrial demand is expected to be faster than the average rate hitherto assumed, the new forecast of demand is, for later years, substantially higher than that adopted in the *First Interim Report.* Because of the relative size of the expected electricity demand of the fertiliser factory and because the scale of the initial fertiliser plant is not yet determined (see Chapter 8 pp. 367-70) it has seemed preferable to give alternative totals which vary with the scale of the fertiliser plant which is eventually chosen. In general, however,

TABLE I

Estimated Demand for Electricity 1959–68

(m.k.w.hs.)

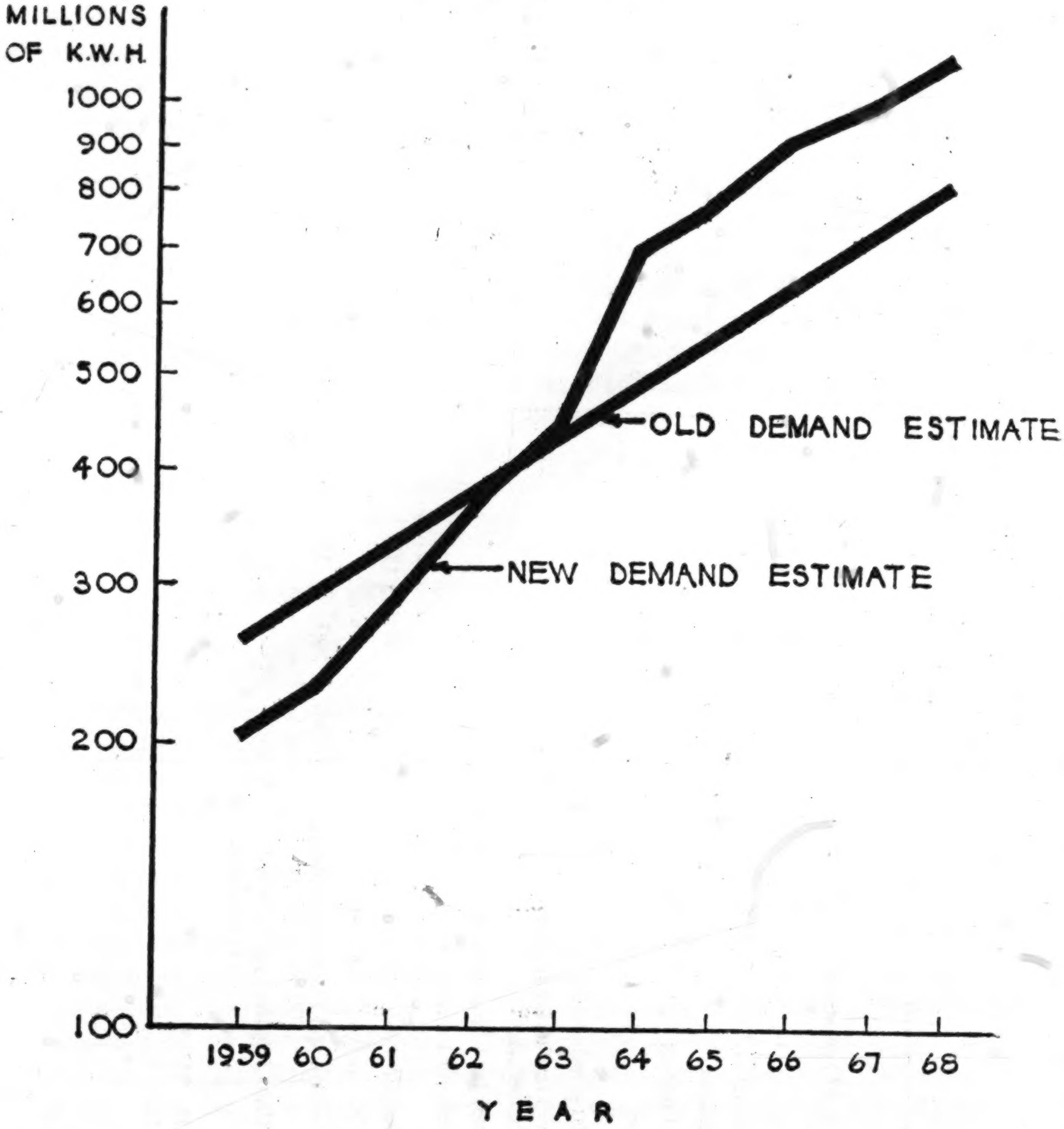
Year ending 30 September	1955	1957	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968
1. Domestic	22·2	26·2	34	36	39	44	50	56	62	67	77	87
2. Commercial	32·6	39·9	49	55	63	69	76	85	96	109	119	131
3. Local Bodies	21·3	29·5	36	41	45	50	56	63	70	79	88	98
4. Public Lighting	1·8	2·2	2	3	3	4	4	5	5	6	6	7
5. Traction	5·0	5·2	6	7	8	9	10	11	12	14	15	17
6. Total Non Industrial	82·9	103·0	127	142	158	176	196	220	245	275	305	340
7. Industrial (excluding fertilisers)	38·4	48·4	25	30	55	100	135	150	185	265	300	360
8. Tea, Rubber, &c.			20	25	30	36	45	53	62	73	85	100
9. Fertilisers (*a*) 1 large plant or								169	169	169	169	169
10. Fertilisers (*b*) 2 smaller plants								106	106	106	106	212
11. Total Sales (*a*) (6+7+8+9)	121·4	151·8	172	197	243	312	376	592	661	782	859	969
(*b*) (6+7+8+10)								529	598	719	796	1,012
13. Transmission and Distribution losses	25·0	29·3	33	37	44	55	64	100	109	124	132	145
14. Total Units Required (*a*) (rounded)	146·4	181·1	205	235	290	370	440	690	770	910	990	1,110
15. (*b*) (rounded)								630	710	850	930	1,150

14=11+13
15=12+13

DIAGRAM VIII

ELECTRICITY DEMAND

1959–68



(SEMI-LOG)

discussion has proceeded on the assumption that the larger unit will be installed. Table I provides details of the new demand estimate, the method of estimation being given in Appendix I. The accompanying graph, plotted on a semi-logarithmic scale, illustrates the differences between the two demand projections.

PROGRAMME FOR INSTALLING NEW CAPACITY

There have also been some revisions in the programme for installing new electricity supply capacity though the general lines of development remain the same as are indicated in the *First Interim Report*. At present, the installed capacity and recommended schedule for installing new capacity is as follows:—

	Completion Date	*M. W. Capacity*	
Present Installed Capacity			
Steam and diesel		27	
Laksapana Hydro		50	
Gal Oya		5	
		——	82
Recommended Programme			
Gal Oya link	Mid 1961	5	
Grandpass Thermal (1)	End 1961	25	
less Obsolescent Thermal	End 1961	15 minus	
Norton Hydro	Mid 1962	50	
Grandpass Thermal	End 1964	25	
Walawe Hydro	Mid 1965	50	
Seven Virgins Hydro (*a*)	End 1966	80	
Seven Virgins (*b*)	End 1967	80	
Mahaweli Ganga Hydro	1969?	?	300
		——	——
			382
	less largest unit		40
			——
			342

Up to 1962 the above programme represents the Electricity Department's firm commitments. While no financial provision has been made for the second operating unit of the Grandpass Thermal Station the civil engineering works, &c., are being carried out on the assumption that the second unit is to be installed at a later date (i.e., in 1964). The Seven Virgins power project and the Walawe and Mahaweli Ganga multi-purpose development schemes are all at the stage of preliminary field investigations, the former being the responsibility of the Department of Government Electrical Undertakings, the latter two projects the responsibility of the Ministry of Lands and Land Development. This necessarily means that for these schemes both expected power output and completion dates are at present somewhat tentative.

When these schemes are added together the cumulative electricity supply capacity position is as follows :—

TABLE II

Recommended Programme—Electricity Supply Capacity 1959–1968

(*M.W.*)

Year ending 30th September	*Installed Capacity*			*Required stand by capacity*	*Effective* capacity*
	Hydro	*Thermal*	*Total*		
1959	55	27	82	12½	12½
1960	55	27	82	12½	69½
1961	60	27	87	12½	74½
1962	60	37	97	12½	84½
1963	110	37	147	25	122
1964	110	37	147	25	122
1965	160	62	222	25	197
1966	160	62	222	25	197
1967	240	62	302	40	262
1968	320	62	382	40	342

*This series does not take into account the 15 M.W. of obsolescent thermal capacity which is withdrawn from active use in 1961, but which is to be maintained on a caretaker basis. Allowance is, however, made for this capacity in estimating maximum possible energy supplies in Table III.

Partly because of Ceylon's dependence on hydro-electric power and partly because of the variable nature of its water resources (one in every four years may be a dry year), it is not possible to give a simple translation of this capacity into potential energy supplies. Consideration has to be given to the four alternatives estimated in Table III, all of which are derived from the same installed capacity. In general terms columns 6 and 12 indicate the long-term supply curve, columns 3 and 9 potential short-term reserves. This statement is, however, subject to two reservations. First, because of the general shortage of capital in the economy and because of the possibility of a tight supply-demand position in particular years during this period it would be a luxury for the electricity supply authorities to regard column 12 as the norm. Use of stand-by capacity in a dry year must be not unexpected and the consequential risk of interruptions to power supplies accepted. Secondly, as far as practicable the aim of general electricity supply policy should be to obtain as close a relationship as possible between hydro supplies (columns 1 and 7) and expected demand, because the average cost of generation per unit of thermal supplies is at least twice the average cost per unit of the present supply system. In terms of marginal costs thermal generation is very much more expensive than hydro.

TABLE III

Energy Potential of Electricity Supply Programme

(Million k.w.hs.)

Year ending 30 September	*Average Year Maximum*			*Average Year Stand-by Capacity*			*Dry Year Maximum*			*Dry Year Stand-by Capacity*		
	Hydro 1	*Thermal* 2	*Total* 3	*Hydro* 4	*Thermal* 5	*Total* 6	*Hydro* 7	*Thermal* 8	*Total* 9	*Hydro* 10	*Thermal* 11	*Total* 12
1959 ..	300	180	480	300	95	395	220	180	400	220	95	315
1960 ..	300	180	480	300	95	395	220	180	400	220	95	315
1961 ..	300	180	480	300	95	395	220	180	400	220	95	315
1962 ..	360	340	700	360	180	540	280	340	620	280	180	460
1963 ..	465	340	805	465	180	645	385	340	725	385	180	565
1964 ..	465	340	805	465	180	645	385	340	725	385	180	565
1965 ..	515	500	1,015	515	340	855	435	500	935	435	340	775
1966 ..	665	500	1,165	665	340	1,005	585	500	1,085	585	340	925
1967 ..	965	410	1,375	965	145	1,110	885	410	1,295	885	145	1,030
1968 ..	1,265	410	1,675	1,265	145	1,410	1,185	410	1,595	1,185	145	1,330

Notes.—(1) The details of the expected hydro supplies are given in Appendix II.

(2) The thermal supplies are estimated on the basis of the maximum number of units that, on the average, can be expected to be generated by the thermal plant. For purpose of this calculation the 15 M. W. obsolescent steam plant, which, depending on the growth of the system load, may be expected to be put on a caretaker basis at the end of 1961 and scrapped when the Seven Virgins scheme comes into operation, has been included.

THE BALANCE OF SUPPLY AND DEMAND

For these reasons it seems reasonable to take column 6 of Table III to represent the long-term supply curve of the recommended programme of installing electricity supply capacity. In an average water year, so long as demand is within this limit, there exist adequate reserve power supplies to prevent power shortages due to mechanical break-downs, overhauls, &c. In a dry year the risk of power shortage arising from causes of this nature would be present but is unlikely to be acute. If, then, this is the accepted supply curve then the balance between supply and demand in the recommended programme is illustrated by Table IV. It must be remembered, however, when interpreting this table that column three does not represent the actual utilisation of thermal power. This is so for two reasons. On the one hand there is not yet an island-wide electricity supply grid so that, for some time at least, certain areas, notably the Jaffna peninsula, will be dependent on thermal power. On the other hand in the present system peak daily loads cannot be met solely by hydro supplies.

A study of this table suggests three major conclusions. (1) Given the expected demand curve, there should be no danger of interruptions to power supplies due to mechanical breakdown, &c., in an average rainfall year, though such a situation could arise if 1964-65 should be a dry water year. (2) A significant rise in the average cost of generation per unit must be expected between 1963 and 1966 unless hydro powers supplies become available earlier than is at present expected. (3) Even if it is the smaller fertiliser plant which is constructed (which would mean that the surplus in column 7 would be 70 million units greater between 1964 and 1967) the scope for further industrialisation other than that allowed for in the industry programme is limited by the availability of electricity supplies. The demands of the proposed steel mill and tyre factory could be met but if, they were, there would be very little surplus capacity left and the probability of periodic power shortages occuring would be increased. It must be realised, too, that any increases in demand beyond those already allowed for in the demand curve would raise still further the average costs of generation in the period 1963 to 1966.

INVESTMENT COSTS

It is now necessary to look at the investment cost of the proposed programme. Details are given in Table V. Rows 1 to 2 are reasonably accurate estimates of projects already in hand. The phasing of expenditure in row 3 is somewhat more arbitrary, rows 4 to 6 still more so. The bulk of the capital cost of extending the transmission and the distribution system up to 1964 is included in rows 1 to 3. Estimates after that date are annual averages so that these costs in any one year may be substantially higher or lower.

TABLE IV

Supply, Demand and Annual Costs of Generation, 1959–1968

	Supply and Demand							*Annual costs of Generation*				
Year ending 30 September	*Hydro Supply* 1	*Expected Demand* 2	*Balance of Thermal Units Needed (2–1)* 3	*Supply of Thermal Units with Stand-by Capacity* 4	*Surplus Thermal Units (4–3)* 5	*Surplus Hydro Units (1–2)* 6	*Total Surplus (5+6)* 7	*Cost of Hydro at 3 cents Unit (Rs. M)* 8	*Fixed Costs Thermal (Rs. M)* 9	*Variable Costs Thermal at 4 cts. Unit. (Rs. M)* 10	*Total Costs (8+9+10)/ (Rs. M)* 11	*Average Cost per unit (11÷2) Cents/Unit.* 12
				(m. k. w. hs)								
1959	300	205	Nil	95	95	95	190	6·2	2·0	—	8·2	4·0
1960	300	235	Nil	95	95	65	160	7·1	2·0	—	9·1	3·9
1961	300	290	Nil	95	95	10	105	8·7	2·4	—	11·1	3·8
1962	360	370	10	180	170	Nil	170	10·8	2·8	·4	14·0	3·8
1963	465	440	Nil	180	180	25	205	13·2	4·4	—	17·6	4·0
1964	465	690	125	180	55	Nil	55	20·7	6·1	5·0	31·8	4·6
1965	515	770	255	340	85	Nil	85	23·1	7·0	10·2	40·3	5·2
1966	665	910	245	340	95	Nil	95	27·3	7·0	·98	44·1	4·9
1967	965	990	25	145	120	Nil	120	29·7	7·0	1·0	37·7	3·8
1968	1,265	1,110	Nil	145	145	155	300	33·3	7·0		40·3	4·0

Notes—1. Supply and Demand : Columns 1 and 2 taken from previous tables.

2. Costs of Generation : Hydro costs are based on the expected cost per unit of the completed Stages I, IIA and IIB hydro programme at capacity output. Thermal costs are those expected from the Stage II B steam plant, once again at capacity output and excluding customs duty on fuel oil which is at present paid by the D. G. E. U. and which amounts to 1 cent per unit. As output will, in fact, normally be less than capacity, the actual unit costs will be somewhat higher than those used in the table, which ignoring price changes, are the minimum expected costs.

TABLE V

Electricity Supply Investment Expenditure, 1959–68

Year ending 30th September	*1959*	*1960*	*1961*	*1962*	*1963*	*1964*	*1965*	*1966*	*1967*	*1968*	*1969–68*
1. Stage II B Hydro	1·1	31·5	31·7	40·7	12·1	1·9					119·0
2. Stage II B Thermal—Grandpass I	2·5	12·3	16·0	15·1	3·8	·1					49·8
3. Grandpass II—Thermal			2·5	10·3	14·0	14·1	3·8				44·7
4. Stage III Hydro	·5	2·5	4·0	23·0	30·0	50·0	50·0	60·0	60·0	20·0	300·0
5. Walawe	·5	2·5	4·0	23·0	30·0	30·0	10·0				100·0
6. Mahaweli Ganga						3·0	4·0	23·0	30·0	65·0	125·0
7. Transmission and Distribution System	2·0	2·0	2·0	3·0	3·0	15·0	15·0	15·0	15·0	15·0	87·0
Total	6·6	50·8	60·2	115·1	92·9	114·1	82·8	98·0	105·0	100·0	825·5

FINANCE

Before considering how this programme can be financed attention should be given to a question of major policy which has been solved only by arbitrary assumptions in drawing up the above Table. The problem is how should the electricity component in a multi-purpose irrigation, land development scheme be costed? This question falls into two parts. First, how should the cost be measured and, secondly, at what time should the electricity department's share of the cost be allocated to it? While no specific answer can be given here to the first half of this question it is important to enunciate the general principle which should guide the electricity department in negotiating in particular situations, namely that viewed as an authority whose duty it is to provide electric power as cheaply as possible (what this means is considered further below) it should only be charged a rate per unit of capacity installed equivalent to that which it would have to pay if it were making its own independent provisions for installing new capacity. In drawing up Table V this principle has been applied by costing the Walawe scheme at the rate of Rs. 2,000 per unit of installed capacity, this particular rate being charged because it represents the average cost (adjusted for price changes) of the hydro components of Stages I and II, which cost is not, at the moment, expected to be exceeded by the Seven Virgins Scheme.

The second part of the question which has just been posed, namely *at what time* should the cost be charged to the electricity department also arose in the course of preparing Table V. From the point of view of an electricity authority there is no need, given the estimated demand curve, for extra hydro power in 1967 and 1968. However, on the basis of the Ministry of Lands and Land Development proposal's for the development of the Mahaweli Ganga scheme, it is likely that hydro power will become available from this scheme in these years. At first glance this problem seems insolvable as the Lands Department cannot be expected to hold up its development schemes until the electricity department is prepared to take power from it. Similarly the electricity department, operating as a commercial enterprise, cannot be expected to bear heavy over-head charges for capacity which it does not need. In fact, however, both departments are part of one central government which is in a situation to make administrative arrangements to provide a solution to the problem. If the overall costs of development are raised because it is impossible, as indeed it is very likely to be, to synchronise the needs for land development with those of electricity generation, then it is reasonable to allocate those extra costs to the central government. Hence it is suggested here that in such cases, where electricity capacity becomes available as a by-product of a land development scheme ahead of electricity department needs, then the Ministry of Finance should be charged with the electricity component of the cost of multi-purpose schemes until such time as the electricity is in fact required as a part of the electricity supply programme.

In the past a substantial portion of the cost of the electricity supply investment programme has been met by foreign borrowing, notably from the World Bank. In the early stages of the present programme further loans have already been arranged for the Stage II B thermal plant (Rs. 31,150,000 out of a total of Rs. 49,800,000) and negotiations are in progress to raise the foreign exchange content (Rs. 80,990,000) of the Stage II B Hydro programme. It must be recognised, however, that substantial domestic loans will have to be arranged for future stages in the programme and/or greater sums must be retained out of the profits of operating the electricity department if only because foreign lenders are likely to be unwilling to hold too high a proportion of the outstanding debt. Some measures which would enable the electricity department to increase its retained profits are suggested below.

In this context there is one further point which should be made clear namely that it can be very short sighted policy for the government of Ceylon to attempt to save relatively small sums of foreign exchange by waiting for foreign government aid instead of going ahead and making its own private arrangements for the investigation of development schemes. Delays of this kind have been known to occur. The ultimate costs incurred in such situations can be really substantial. Thus if the Seven Virgins Scheme were to suffer unnecessary delay for reasons of this kind and, for example, its completion date postponed one year the additional cost per unit generated would be of the order of one cent (see Table IV) and the additional cost for the year's output would be roughly Rs. 9 million. This calculation ignores possible increases in industrial output which might have taken place if adequate supplies of cheap electricity would have been available at an earlier date. The government must be prepared to weigh very carefully the gains from present savings against the prospect of future losses in situations where the losses can be on this scale.

While it is true that a substantial proportion of the costs of investment can in principle be financed out of retained profits it has to be recognised that undue reliance on retained profits may be in opposition to other policy objectives in particular to the policy of fostering industrial development. A high degree of profit retention means high unit charges for electricity supplies. Industrialisation is fostered by cheap electricity. It is important that the government make clear to the electricity supply authorities its views on the relative priority of these alternatives.

PRICING POLICY

If the government should take the view that, to a large extent, electricity supplies and industrialisation are joint products, it is in a favourable position, at the moment, to take steps which will aid both profit retention and cheap electricity. At present the Department of Government Electrical Undertakings is liable to payments in lieu of income tax and to customs duty charges on imports of fuel oil and on capital equipment needed to build up capacity. In terms of the 1956-57 accounts of the Department the payments in lieu of income tax are equivalent to 14 per cent. of the then average price, i.e., 2.1 cents per unit. Similarly in that year customs duties on fuel oil added almost one half a cent to the average selling price. In terms of marginal costs it is the case that each additional thermal unit, at the moment, includes at least one cent customs duty. The customs duty component of capital costs is much more negligible. It is probably of the order of one tenth of one cent per unit. The absolute amounts involved are, however, quite substantial.

The basic requirement of the Department of Electrical Undertakings that it should, in general terms, act as a commercial enterprise and aim at achieving a balance between current receipts and current revenue and provide a surplus towards meeting the costs of expansion and replacement of its assets is a desirable one. To remove from the Department its requirement to make payments in lieu of income tax does not, however, at all effect this general objective. The raison d'etre of company income tax is to obtain, cheaply in terms of administrative costs, for the general public a share in the profits of private enterprise. When, as in the case of the Department of Electrical Udertakings the enterprise is not in private hands and when the industry is one in which the question of unfair competition with private enterprise does not arise this reason for the levy has no force. Its use here, is simply that of providing an apparently relatively painless (from the Finance Minister's point of view) source of revenue. Its disadvantages far out weigh its usefulness, for a tax on power contributes in a compound form through a variety of profit margins to increased costs of a large variety of domestic products and services, is an extra charge on a wide range of export industries affecting their competitive position in world markets and is a deterrent towards the setting up of new industrial enterprises of all sorts, which as has been argued elsewhere, is one of the central requirements for the future economic development of Ceylon. It also makes much more difficult the process of profit retention. There is no doubt that the Department of Electrical Undertakings should be relieved from this requirement as soon as possible. Administratively this could be simplified by giving the proposed new Ceylon Electricity Board statutory exemption from payments of this nature.

There is also a good case to be made for freeing the electricity department from the need to pay the Customs duty on fuel oil. As has been indicated these charges account for one half cent in the present average price of electricity and are equivalent to one cent in the present expected marginal cost of thermal supplies. To impose such an import duty means that it is necessary to impose higher import duties than would otherwise have been the case on industrial imports generally in order to provide them with any given degree of protection. A further advantage of freeing the central electricity authority from such a duty is that it would give that authority still greater competitive advantages against private users of diesel fuel. By being able to offer a still cheaper price it would quicken the pace of drawing private electricity consumers into the central network and make possible more economic use of the existing and growing heavy investment in the transmission system. The general advantages of this process are further indicated below. Finally it must be emphasised that the sharp rise in average costs of generation expected between 1963-66 will be exaggerated if a customs duty component has to be added to the calculations made in Table V.

It has also been urged that the present high rates of customs duty on imports of electrical goods generally should be abolished. Thus it is argued that one of the obstacles to the more wide-spread use of electricity, is the present high cost of wiring and equipment in common use. Customs duty probably involves a 15 per cent to 25 per cent increase in the cost of wiring as well as equipment. The waiver of customs duty will reduce, for example, the cost of wiring a point from Rs. 25 to Rs. 20 and the cost of a commonly used item like an electric kettle from Rs. 40 to Rs. 30, and will go far as a practical measure to promote the increased use of electricity, both industrial and in the domestic and commercial spheres. While an abolition of customs duty on electrical equipment imports would undoubtedly stimulate demand, the case for abolition is not as clearcut as that outlined in the previous paragraphs. It would seem better, at the moment, to urge that the question of the abolition or lowering of customs duties on capital equipment, domestic appliances, &c., be referred to the proposed new Tariff Board for its consideration when it is recasting the whole system of customs duties.

The immediate cheapening of power has desirable effects in addition to the incentives which it provides for development in general and industrialisation in particular. At the moment in Ceylon power costs are weighed down by heavy overheads, the high proportion of overheads being very largely a function of the smallness of the present supply system. This means that there are considerable potentialities for the lowering of the real costs per unit of electricity supply simply through expanding output either from a given plant capacity or from increased capacity. By cheapening electric power now demand is likely to increase more rapidly than it otherwise would and the prospects of progressive reductions in the supply price of electricity are brought nearer.

There is one other aspect of pricing and costing policy which should be given serious attention. When, as in the case of thermal and nuclear plants, the expected useful economic life of the plant is 20 years, amortisation of the loans financing these plants over a similar period is quite justifiable. When, however, as in the case of hydro plants the expected useful life is much longer—of the order of forty years—there seems to be no point in providing cheap electricity for the next generation at the expense of this—simply because the amortisation period of the loan is half the useful life of the asset. In so far as the shorter amortisation period is simply the convention applied by international lending agencies the Government ought either to use its influence in the various international institutions to see that more rational amortisation periods are employed or to seek funds for hydro projects from other sources. If these endeavours should prove fruitless the government should consider making the additional costs, due to the difference between loan amortisation terms and real depreciation costs, a charge on the Treasury rather than on the Electricity Department. This may seem a rather unimportant point—a matter of mere accountancy. In fact, however, capital and interest charges are such a large part of the running costs of hydro plants that, barring a return to cheap money, a lengthening of the amortisation period of hydro loans is one of the most important ways of extending the period during which it will remain economic to harness Ceylon's water resources in face of the expected decline in costs of nuclear power generation.

HYDRO versus NUCLEAR POWER—THE IMMEDIATE PROSPECTS

At one stage, during the course of the preparation of this report on electric power supplies it was indeed thought that the time had already come when it would be appropriate for Ceylon to turn to nuclear power as a source of electricity. In terms, simply of comparative costs of generation, it could be the case that it would be cheaper to use nuclear generation instead of a second thermal unit at Grandpass in 1964. However, given the meagre world wide experience in operating nuclear plants and the present level of general technical "know-how" in Ceylon it is clear that such a rapid switch to nuclear power is not yet justified.

It is nevertheless improbable, on the basis of existing knowledge of comparative costs, that it will be worth-while installing any more thermal plants in Ceylon after the second steam unit has been installed at Grandpass in 1964. The basis for this view is provided by the following table of comparative costs:—

TABLE VI

Comparative Costs of Electricity Generation

Scheme	*Power Generated*		*Capital Cost*	*Running Costs*	*Costs per k.w.h. generated*		
	Average Year	*Dry Year*			*Average*	*Dry*	*Four Year Average*
	(m.k.w.hs)		*(Rs.M)*	*(Rs.M.)*	*(Cts.)*	*(Cts.)*	*(Cts.)*
Hydro							
Stage I and II	436	356	200	13·2	3·0	3·7	3·2
Walawe	200	160	100	7·8	3·9	4·9	4·2
Seven Virgins	600	480	300	23·4	3·9	4·9	4·2
					Loan charges and operating costs	Fuel cost	Total
Thermal							
Grandpass I	122		42	7·35	2·4	3·65	6·05
Nuclear							
India	150 M.W.		340				4·5
United Kingdom	200 M.W.		333				3·7

Notes.—(1) The above costs per unit are capacity cost and hence would presumably be higher under operating conditions.

(2) Hydro Stage I and II is based on estimates made by the Department of Government Electrical Undertakings.

(3) Walawe and Seven Virgins are rather arbitrarily costed on terms of expected output as given in the *First Interim report* and the ratio of hydro running costs to capital cost of 7·8% used in that report.

(4) Grandpass I unit costs are based on an estimated 57% load factor which is expected to be the system load factor at about the time when it should commence operation.

(5) Indian nuclear costs are taken from a paper by Dr. H. J. Bhabha "The Need for Atomic Energy in the Under-developed Countries", except that they are here calculated on a 60% load factor.

(6) United Kingdom costs are on a 75% load factor. Adjusted to a 60% load factor they would become about 4·6 cents per unit.

Unfortunately ; except for the figures relating to Stages I and II hydro programme and those for the Grandpass thermal station, the estimated unit costs are not accurate enough to be reliable guides. In addition the nuclear figures are for supply units which are much larger than is practicable given the present scale of the electricity supply system as a whole and even as it will be ten years hence. What is needed in the context of Ceylon are estimates of costs for nuclear plants of the order of 50 M.W. and at the most 100 M.W.[1]. Despite the weakness in the present figures the differences are sufficiently large between thermal and nuclear plants for there to be a prima facie case that it is uneconomic for Ceylon to construct more thermal plants, other than those already contemplated.

When longer term prospects are taken into account this view is considerably strengthened. It is not expected that there will be any startling reductions in the costs of energy produced by thermal plants over the next decade or so. Nuclear power engineering is, however, on the frontier of technical advance and there are firm expectations of substantial reductions in unit energy costs within the next decade. Indeed these espectations are such that it should not be very long before nuclear plants are competitive with Ceylon hydro costs. This will be even more so if it should be the case that subsequent hydro schemes are more, not less expensive than those already under consideration. If this is so there are a number of important implications both for future electricity supply policy and for the costing of future land development schemes which should be noted. First it must be a central duty of the electricity supply authority—as is at present the case—to keep close watch on world trends in nuclear power generation. Secondly they should continue a policy already begun of providing members of staff with training in nuclear plant operation so that they will be in a position to avoid unnecessary delays when it does become economic to operate nuclear plants. Thirdly, it must be realised that before very long nuclear energy costs will be the yardstick whereby the electricity generation costs of multi-purpose land development schemes must be judged. This watch over developments in atomic energy by the electricity department will naturally be conducted in collaboration with the proposed new Atomic Energy Authority.

IMPLEMENTATION OF ELECTRICITY PLAN—RECOMMENDATIONS

To sum up:

1. The electricity supply authority should be informed that its objective for installing new capacity over the next decade is as is described on page 410, except that, if it is technically possible, hydro power from Walawe and Seven Virgins should be made available at earlier dates.

2. Immediate steps should be taken to relieve the electricity supply authorities from the necessity of making payments in lieu of income tax and from the payment of customs duty on imports of fuel oil. Some part

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[1] The Planning Secretariat has taken steps to obtain the latest data on plants of this scale from the various consortia in the United Kingdom which have entered the field of constructing nuclear plants.

of this relief from taxation should be passed on to consumers by means of a reduction in average unit prices. The balance should be used for re-investment and for reserves against expected fluctuations in average generation costs which will occur during the plan period.

3. It should be the duty of the electricity department to keep a close watch on developments in nuclear power engineering and to prepare itself by training staff, &c., for making use of this source of electrical power supplies as soon as it becomes economic to do so.

4. In future loan negotiations for the finance of hydro projects the Government should endeavour to obtain amortisation terms for a period of years (say 40) more in accord with the actual expected life of such assets.

5. The question of the abolition or lowering of customs duties on electrical equipment imports should be referred to the proposed new Tariff Board.

6. It has been implicitly assumed, in the preparation of this report, that the proposed new Central Electricity Board will be established and that it will absorb into its network supplies at present handled by local bodies. This proposal has then the support of the National Planning Council.

APPENDIX I

Assumptions behind the Estimates of Electricity Demand 1958-59 to 1967-68

Non Industrial Load : The aggregate demand was estimated by assuming a straight line trend in the rate of growth which occurred between 1954-55 and 1956-57 ; the individual components of this type of demand were estimated on the assumption that the 1956-57 proportions would be maintained.

Industrial Load : The general Industrial demand was estimated as is indicated on p. 356 of the Industry Chapter. The size of the fertiliser demand depends on which of the alternative schemes discussed in the Industry Chapter (pp. 367–70 is adopted.

Cottage Industries : Thought has been given to the requirements of small-scale and cottage industries. For some time, however, their needs are more likely to involve extensions to the transmission system rather than heavy demands in terms of energy requirements.

Tea : It has been estimated that it requires one k.w.h. of electrical energy to produce 5 lb. of tea (*First Interim Report* p. 148). Assuming a total output of about 490 million pounds in 1968, as is estimated in tea expansion programme, the potential power demand for tea by that date would be about 100 million k.w.hs. In view of the large number of new diesel engines installed on tea estate, it is unlikely that they will switch over to electricity at present prices. If, however, prices are brought down and regular supplies assured it should be possible to sell to tea factories 30 million k.w.hs. by 1963 and perhaps 60 million by 1968. Annual figures have been interpolated on the basis of these estimates.

Rubber, Coconut, Rice mills, &c. : On rather arbitrary assumptions this demand has been assumed to be 15 million k.w.hs. by 1963 and 40 million in 1968. Annual figures have been estimated on the basis of these estimates.

Transmission and Distribution Losses : These amounted to 20·7% of sales in 1954–55 and 19·3% in 1956–57. A straight-line declining trend in this ratio to 15% in 1968 was assumed and applied to the estimated sales derived in the manner described above.

APPENDIX II

Composition of Expected Hydro Power Supplies 1959–68—Average Rainfall Year

Year ending 30 *September*	*Hydro I and II*	*Gal Oya*	*Hydro II B*	*Seven Virgins*	*Walawe*	*Total*
				(m. k. w. hs.)		
1959	300					300
1960	300					300
1961	300					300
1962	300	30	30			360
1963	300	30	135			465
1964	300	30	135			465
1965	300	30	135		50	515
1966	300	30	135		200	665
1967	300	30	135	300	200	965
1968	300	30	135	600	200	1,265

CHAPTER 10

TRANSPORT AND COMMUNICATIONS

Overall Features

THE pattern of the transport system of the country will undergo substantial changes as the various agricultural and industrial programmes included in the Plan are progressively implemented. For instance, it will be necessary for the anticipated increase in output of our major plantation industries to be moved towards the ports. On the other hand, the direction of movement of certain articles like fertilisers will be completely changed when these articles are manufactured here and not imported as they are now. In certain instances the increasing output of agricultural products and manufactures will imply diminishing movements of these commodities to the ports, and, at the same time a growing demand for the internal transport requirement. In other cases where industries are set up in the vicinity of the consuming centres, there is likely to be a reduction in the demand for transport, at least, locally. By and large, however, the cumulative effect of the Plan will be to increase the overall demand for transport facilities. To cope with the problem, the probable points of increasing demand for transport facilities should be known in order that the necessary transport facilities may be planned well ahead of the proposed development.

Planning for transport development is bound to lack the precision that one would expect in planning certain other sectors of the economy, e.g., agriculture. In agriculture one can predict with a fair degree of precision what the country's consumption would be, say, ten years hence, on the basis of the anticipated increase in population. The demand for transport, however, depends on such factors as the location of new industries, and the settlement of new areas. The associated flows of traffic can be anticipated, but not with the same degree of exactitude.

While it may not, at this stage, be possible to predict particular traffic flows precisely the requirements of the transport sector as a whole in the context of the Ten-Year-Plan can be estimated reasonably accurately. On the basis of existing data concerning levels of investment in this field; of estimates prepared by Ministers and Technical Working Groups; and of indications concerning the future pace of development in the economy as a whole, the desired magnitude of an investment programme for the transport sector has been established.

The total provision as established in this way, for investment in transport over the whole of the ten-year period is Rs. 1,941 million. The broad distribution of this amount over the major categories in this sector is as follows :—

TABLE I

Distribution of Investment in Transport 1959–1968

	(Rs. million)
Ports and Harbours	372
Roads	516
Railways	301
Aviation	48
Posts and Telecommunictions	153
Commercial Vehicles	338
Buses	168
Miscellaneous (including shipping)	50
	1,946

These figures relate to all direct investments in the categories above. They include both public and private investment. Within the public sector, they cover investments to be made by several departments and agencies. For example, investment on roads by the Department of Irrigation and Land Development are included in the total allocation for roads, and the programme for fisheries harbours is included in the allocation for ports. At the same time, the allocations exclude departmental quarters. These are contained in the housing programmes specified elsewhere. The provision for miscellaneous items includes an allocation for investment in the field of shipping.

As in other sectors covered by the Plan, it is envisaged that a small proportion of the investment in transport would be demonetized and be brought within the scope of community development and self-help programmes. This is particularly true of constructional activity in the rural areas in respect of roads. The magnitude of the self-help contribution over the ten-year period is estimated at Rs. 100 million. After allowance is made for this, a broad distribution has been made of total investment between the public and the private sectors. This is shown below :

TABLE II

Public and Private Investment 1959–68

	(Rs.million)
Government (including local authorities)	1,652
Private	194
Self-help	100
Total	1,946

The distribution here is not intended to be rigid. But the high proportion attributed to Government reflects the acknowledged responsibility of the state in the field of economic over-heads.

The total volume of investment in transport will be realised through a stepping up of annual investment over the period of the Plan. The stepping up is not however continuous because of the "lumpy" nature of some of the major items in this field. The table below depicts the general phasing of these investments drawn up in the background of the pace of development envisaged for the economy as a whole and of the relative importance of particular transport needs.

TABLE III

Phasing of Investment in Transport and Communications, 1959–1968

(Rs. million)

	1959	*1960*	*1961*	*1962*	*1963*	*1964*	*1965*	*1966*	*1967*	*1968*	*Total 1969–68*
Roads	32	35	40	44	48	51	57	63	69	78	516
Railways	21	48	30	25	25	27	28	29	32	36	301
Ports and Harbours	11	19	54	67	51	31	28	29	39	44	372
Aviation	2	1	5	5	5	5	6	6	6	7	48
Posts and Telecommunications	8	9	11	13	14	16	19	20	21	22	153
Vehicles	23	25	27	29	31	34	36	39	44	50	338
Buses	15	15	15	16	16	17	18	18	18	20	168
Miscellaneous (including shipping)	—	—	2	4	4	6	6	8	8	12	50
Total	112	152	184	203	194	187	198	212	237	269	1,946

Notes : (1) For further details see particular Transport programmes.
(2) Totals may not add exactly because of rounding.

The magnitude of investment in transport and communications in 1957 was Rs. 117 million. As the figures above indicate, by 1968 this magnitude is expected to rise to Rs. 269 million. It should be mentioned that both the phasing and the totals depicted here differ from the phasing of programmes as provided by Ministries and Departments as shown in the Report of the Technical Working Group on Transport. These alterations were made in order that the needs of transport as a whole should conform with the overall requirements of the Plan. At this stage the relative needs of transport in some of its aspects are difficult to establish so that it may well be the case that some further revisions will be made within the transport sector in the light of the findings of the subsequent investigations into true relative transport costs which are recommended in the section below on Transport Policy.

The estimates in Part I of this Report relating to the Ten-Year Plan as a whole throw light on certain other important aspects of relevance to the expansion of the transport sector. The following table indicates the expected change in the contribution of transport and communications to the gross domestic product between 1957 and 1968.

TABLE IV

Contribution of Transport and Communications to the Gross Domestic Product 1957–68

(Rs. Million)

	1957	1968	*Increase*	*Percentage Increase*
Total gross domestic product	4,975	9,445	4,470	90
Contribution of transport and communications to gross domestic product	258	466	208	80·6

The increase in employment as a result of the investment programmes for Transport has also been broadly estimated. By relating these figures to estimates of gross domestic product in transport, as well as to estimates of investment, it is possible to assess both the change in gross domestic product per man and the investment cost per unit of additional employment implied by the Plan. These results are presented in the table below:

TABLE V

Employment, Productivity and Investment Per Man in Transport and Communications 1957—1968

	1957	1968	*Increase*	*Percentage Increase*
Employment (Nos.)	155,000	209,000	54,000	34·8
Gross domestic product per man	Rs. 2,690	Rs. 3,228	Rs. 538	20·0

Investment cost of employment per man : Rs. 30,900.

It is necessary to emphasise that the employment figures above relate only to those directly engaged in the provision of services in the field of transport and communications. They exclude the considerable numbers engaged in constructional work pertaining to the building of roads, harbours, airports, and so on. These persons are classified in the Overall Plan under the heading of "construction" discussed elsewhere in this Report. It is also necessary to indicate that in conformity with the definitions adopted in the Plan the employment figures comprise persons working on both a wage and a non-wage basis.

Transport Policy

The objectives of transport policy should be to provide and maintain, safe, adequate, economical, and efficient services, at charges fairly related to expenditure. These services should be provided at as low a cost as possible in terms of the real resources of the nation. To achieve this objective and considering the rapid development of alternative forms of transport it is necessary to adopt a policy of transport co-ordination.

In the past, there has been a shortage of transport, and there is now a demand for rapid expansion to meet the requirements of economic development. The problem is both to promote investment and development and to co-ordinate existing facilities. The development of the various modes of transport needs to be planned in such a manner as to afford the maximum satisfaction of the transport requirements of the national economy at the lowest cost in terms of the nation's real resources, preserving, at the same time, the elements of healthy competition, and the inherent advantages of each mode. Existing transport shortages are likely to be seriously aggravated by future demands of economic development. Transport capacity must therefore be expanded as quickly as possible. Transport should not only respond to the demands made on it, but be an instrument for furthering economic development.

In making decisions along these lines the view that the differences in the rates and fares for the same transportation task as between the various forms of transport in most cases should afford a broad index of the comparative cost of each has been accepted. As the user would be guided by the rates, taking into account the factors of service and convenience, his freedom to choose carries with it the implication that each form of transport is used in the way best suited to the economy of the nation. Thus the proper co-ordination of the different forms of transport on the basis of the natural suitability of each would be achieved.

Transport in this country is now under the control of two Ministries—the Minister for Transport and Power, and the Minister of Nationalised Services and Shipping. The Minister for Transport and Power controls the Railway, the Department of Civil Aviation and the Department of Motor Traffic, while the new Ministry controls the Ceylon Transport Board, Ports and Shipping. It is important that there should be the closest co-operation between the two Ministries as the cardinal requirement for transport is a unified or at any rate, a harmonised policy at the apex and centre. Certain aspects of transport policy, such as the regulation of fares and charges, for example, or the promotion of safety require the highest degree of liaison between the two Ministries.

If a balanced transport system is to be obtained, policy questions connected with 'track' must be brought together at one point; whether highway, railway, air-field, or waterway, the development of the physical structure of the country's communications is a matter for a unified policy. If healthy development of the various forms of transport is wanted, with each from progressing to the degree of its 'inherent' advantages, unhelped or unhindered by regulation to a greater extent than its rivals, the closest liaison between the different departments and authorities concerned is necessary.

It is therefore recommended that the continued development and co-ordination of the various forms of transport should be the function of an independent regulatory authority controlling all forms of inland transport.

Such an authority should be established by statute. It should be given the power to authorise the expansion, curtailment and abandonment of services. It should be required to administer the regulation of all forms of transport in the interest of co-ordination so as to preserve healthy competition. It should be vested with complete control over rates and fares and should ensure that these were such as generally to reflect costs (including the 'track' costs). The authority should also be charged with the responsibility for making recommendations for the co-ordinated development of Transport in accordance with the requirements of economic planning, and assisting the flow of investment for transport development in keeping with national requirements.

It will be useful to consider some of the issues which may be expected to confront such an authority in the context of the developments expected under the Ten-Year Plan. Little can be said here about the relative merits of capital investment in the different fields of transport. In the Plan itself it has only been possible to make rough estimates of relative needs. What is now required, is a thorough investigation: of the costs of maintenance and replacement of "track" in the different fields; of the proportions of this cost which it would be reasonable to charge to different types of consumers; and, in relation to these estimates and to estimates of the expected flows of traffic, what would be the most economic relative use of new investment in roads, railways, ports and aviation facilities. This investigation could be assisted by outside experts but should be primarily the function of the secretariat which would need to be attached to the transport policy co-ordinating authority.

Rather more can be said about the issues affecting current running costs though, even here, final judgments would depend on the outcome of the investigations discussed in the previous paragraph. It has already been stated that in general consumers should meet the cost of the services which they receive. At the moment in the case of government transport services this is not being done. Bus and railway consumers are being subsidised by those who do not use these services or by those who only use them to a minor extent. As far as passenger services are concerned, in the context of the development needs of the country, it would appear to be difficult to justify a continuation of these subsidies. The Ceylon Transport Board in recognition of this fact already has a proposal before the Fares Board to increase its fares. If bus fares should rise this may well mean that thought should be given, if only as an interim measure before true relative costs are estimated, to a rise in railway fares. This might become necessary, because to a considerable extent urban bus and train services are competitive. One sided adjustments in either bus or train fares to some extent may shift the incidence of the loss and are thus likely to be higher than would otherwise be the case. Such a rise in railway fares would not eliminate its losses but would go some way towards reducing them.

In the sphere of goods transport the problem of subsidies is more intractable especially in the absence of the detailed cost estimates which were mentioned in an earlier paragraph. In the case of a transport service such as railways which caters for both passengers and goods it is an extremely tricky conceptual problem to allocate costs between the two types of services. In a narrow accounting sense it could be argued that goods railway traffic is not subsidised, that rather it makes profits which go some way towards reducing the passenger losses.[1] On the other hand this is not an abnormal feature of railway pricing policy elsewhere in the world. What is really relevant in Ceylon is that the joint returns of passenger and goods traffic are not sufficient to meet costs and that steps should be taken to increase both forms of revenue. This does not mean, however, that it would be advisable to raise the rates charged on goods traffic. What is wanted in this case is a much greater utilisation of existing railway goods capacity at the same or even lower rates. This and other questions of transport pricing policy are discussed in more detail in the sections relating to particular forms of transport.

Ports

THE NATURE AND URGENCY OF THE PROBLEM

Probably the most urgent transport problem facing the economy at the moment is the congestion in the port of Colombo. Ceylon is an economy which is extremely dependent on foreign trade the great bulk of which flows through this port. In 1957 the ratio of imports plus exports to domestic expenditure was about 65 per cent. While this proportion is expected to fall during the period of the Plan it will still remain very high. As this is the case it must be obvious that any source of inefficiency and hence higher costs which affects this proportion of domestic expenditure has major effects on the whole structure of domestic prices and costs. As the port of Colombo is in this key position it must be equally obvious that the solution of its problems must have the highest priority. This is all the more so because it is not only domestic prices, costs of living and wages which are affected but also the competitive position of export industries in the world markets and of domestic import substitute industries in the home market. Furthermore, through unduly high freight costs, demurrage, &c., charges, and losses of earnings on transhipment cargoes there are substantial direct losses of valuable foreign exchange.

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[1] See the figures on page 32 of "*Reports of Committees and Technical Working Groups.*, Planning Secretariat, 1959 (which supports such a view).

For all these reasons immediate steps must be taken to remedy the situation. But first it is necessary to understand the nature of the problem. The strains on the port of Colombo are not due, to any significant degree, to lack of berths. Nor is likely that the major problem is the inefficiency of the work force though it may well be a contributing factor. To a very large extent it would appear that the ill-functioning of this port is due to technical bottlenecks in the flow of goods from the ship to the final consignee and vice versa. These bottlenecks in turn hinge on the lack of adequate warehouse space. By the very nature of the case, cargo does not flow evenly throughout the course of a year. Warehouses, which could, perhaps, just cope with that flow if it were evenly maintained become congested and form a bottleneck whenever there are sharp upward fluctuations in the flow of goods. Once established these bottlenecks are extremely difficult to remove. Certainly they cannot be eliminated except at excessive cost. This is the situation which has developed in the port of Colombo. There is not sufficient warehouse space to permit marked fluctuations in the flow of goods to be absorbed without causing congestion in the port and the familiar sight of ships outside the harbour.

For some time this issue has tended to be confused partly because attention has been concentrated on the expectation of a substantially increased flow of goods into the economy as a result of the process of development. It is this approach which lies behind much of the discussion in the Planning Council's Technical Working Group Report on the development of port facilities. It is only very recently that it has become possible to test this view against the expected results of the detailed operation of the plan in the sphere of foreign trade. When for instance, the expected demand for imports over the next ten years in the context of the developments envisaged by the plan is examined closely it appears that previous forecasts in terms of quantities imported have been over-stated. The Plan is one essentially concerned with import replacement and over the next ten years it is very largely import replacement of foodstuffs, cement and fertilisers all of which are heavy commodities at present imported in large quantities. This means that while there is expected to be a substantial increase in the value of imports over the next ten years it does not appear to be the case that there will be any sustained substantial increase in the tonnage of goods to be handled. For the first half of the period a moderate (perhaps 15 per cent.) increase can be expected which, however, is likely to be followed by a decline in the tonnage handled. What in fact is expected to occur is a change in the composition of imports—a substitution of the heavy relatively cheap items mentioned above by less heavy (in relation to price) imports of semi-finished goods, raw materials and capital equipment.

If this is the correct appraisal of the situation than the problem is not so much to seek extra port berth facilities, preferably outside Colombo, but to concentrate attention, and take immediate steps to improve, the cargo handling capacity of Colombo itself. As has been pointed out earlier this appears to be primarily a question of removing bottlenecks in the flow of goods by the building up of a reasonable reserve of warehouses capacity. It is along these lines that thinking by the Colombo cargo handling authorities has developed and it is to meet this situation that they have prepared a detailed plan for improved warehouse facilities. There seems little doubt as to the priority of their proposals.

The scheme falls into two parts. The first relates to imports which account for about two-thirds of total tonnage handled and the second to exports. In the case of imports, while it is expected that the volume of food, fertilisers and cement, which account at present for well over half the total volume of import cargo is expected to fall over the next ten years, it will remain substantial throughout the period. This significant fact should be borne in mind in designing the pattern of cargo handling operations in the port, the construction of transit sheds and warehouses, &c. Two of the main individual items, fertilisers and cement, are handled by a small number of importers. The clearance of such cargo through the port is limited by the capacity of these importers to remove such consignments which constitute a sizable proportion of total imports. In order to cope with this special problem of the port it would be necessary to provide special arrangements for the handling of these two items of cargo. To prevent the general cargo warehouses being congested with fertilisers or cement, it would be advisable to discharge these items of cargo overside in the stream and remove them to convenient points of clearance. The Beira Lake Basin will be a convenient point of handling enormous quantities of what is referred to in port parlance as " nuisance cargo ". This arrangement will help to relieve the vehicular traffic congestion in the port as well. Full shiploads of fertilisers and cement can however be conveniently cleared at alongside berths direct into consignees' transport.

Export cargo in the port of Colombo is handled in a rather primitive fashion. The bulk of exports do not route through transit sheds. They are not warehoused in advance of the arrival of vessels. This is largely due to the inadequacy of export warehouse accommodation. The expeditious handling of this cargo under such a scheme depends therefore on a perfect co-ordination of traffic from the exporter's godowns through the Customs (and the cargo lighters) to the holds of the ship. This is a patently inefficient and unsatisfactory scheme of operation. This is one of the principal reasons why an effective control and co-ordination of export traffic, and a speedier handling of export cargo in the port are not feasible. Even in a comparatively ill-equipped port like Trincomalee, where the labour is less experienced, a more expeditious handling of export cargo than in Colombo should be possible for the reason that the flow of cargo can be regulated and export cargo can be warehoused before shipment. The construction of export warehouses or transit sheds for the movement of all export cargoes in the port is therefore essential. It will considerably expedite cargo handling in a sector of the port which is primary importance to the national economy. Export cargo too, unlike imports, is expected to increase by about 20 per cent. in volume by 1968.

A final point which should be noted is that there has been a serious reduction in the volume of transhipment cargo handled in the port in recent years. This situation must be viewed with concern. Transhipment cargo should be an attractive source of revenue to this country and every effort should be made to encourage and rebuild this trade. This will not be possible until the turn-around period is substantially reduced from its present high level.

The immediate construction programme to meet these needs is as follows :—

A. *Beira Lake Reclamation*

B. *Construction of warehouses*

(1) Three large transit shade in the Beira Lake Basin on the McCallum Road front (when the Beira Reclamation Scheme is completed.) These transit shade will be used primarily for the reception of cement and fertilisers, &c.

(2) A three storied warehouse on the Chalmers Quay on the present site of the cement warehouses which will be demolished as soon as the Beira Scheme is ready. The original Rs. 13 million plan drawn up by the Food Ministry should be revised to meet present requirements. When this scheme is completed almost the entirety of Government food cargo (rice and sugar) can be handled through the warehouses on either banks of the Chalmers Canal.

(3) Two warehouses on Queen Elizabeth Quay to be located at the Customs wall and opposite the yard space between warehouses Nos. 1 and 2 and between warehouses Nos. 3 and 4. This will serve the " Repository " needs of Queen Elizabeth Quay (Unit No. 1).

(4) Reconstruction of the Bonded Warehouse in the Port Unit. The ground floor to be utilised as a repository to serve this area (Unit No. 2).

(5) A two storied warehouse on at the Delft Quay (original site for Canteen). The provision of this "repository" will release Delft Warehouse (2) for the reception of general cargo from Berth No. 2.

C. *The construction of a Transhipment Warehouse*

A two storied transhipment warehouse on the Beira Lake water front—Morgan Road access. This should be large enough to accommodate over 30,000 tons of transhipment cargo.

D. *Construction of piers and jetties*

(1) The provision of piers in the Kochchikade Coal Ground area (State I proposal of the Port Commission). This proposal envisaged alongside facilities for six large ships and two coasters (as against the loss of four buoy berths). These berths and the proposed transit sheds and warehouses (preferably two storied) will provide the essential facilities for handling export cargo. (Ancilliary office buildings should also be constructed). This scheme will permit the radical change in export cargo handling which is considered to be indispensable for the more efficient and expeditious operations in one of the most important sectors of the port. Ultimately this arrangement will release about six lighter landing points and a very large transit shed in Bagdad area, for import cargo.

(2) About three or four jetties and other lighter landing points should be provided in the Beira Lake Basin, where the construction of a transhipment warehouse and import cargo transit sheds are proposed.

E. *Construction of a Customs Sales Centre*

A new Barge Repair Yard and 24 slipways will be necessary when the new steel lighters are put into use. The two acre reclaimed land on the Beira should serve this purpose.

F. *Barge Repair Yard*

A new Barge Repair Yard and 24 slipways will be necessary when the new steel lighters are put into use. The two acre reclaimed land on the Beira should serve this purpose.

G. *Beira Canal Locks*

The size of these locks should be increased to permit movement of large-sized lighter craft.

The construction programme outlined above should meet the urgent needs of the port today. The implementation of this scheme will result in increasing the warehouse capacity of the port by 50 per cent. The improvements to the port in this vital aspect, and the proposed consequential changes in the pattern of cargo handling operations will improve the capacity of the port, and not only permit of coping with the anticipated increase in the annual import tonnage of cargo in the next few years, but also provide, *at all normal times,* that cushion of reserve capacity which is a sine qua non for the efficient working of any port in the world. This will ensure that any temporary setbacks in the port will not set up a chain reaction and a rapid cumulative effect in creating congestion further along the line as has happened in this port after the period of labour unrest in 1957 and the dislocations preceding nationalisation in 1958. Finally, the proposed scheme will, in a large measure, provide the answer to restoring the reputation of this port as quickly as possible, the speedy turn-round of ships and the expeditious handling of the increased volume of exports which are anticipated in the next ten years.

The amount and phasing of the investment expenditure needed for the development of the port of Colombo are given in Table VI. It must be emphasised that this expenditure must have the highest priority. Further, the control of spending should preferably be through the Port (Cargo) Corporation as this authority is in a position to by-pass normal government financial regulations which, if enforced, would cause inevitable but inadvisable delays. Formally, some of the spending involved will necessarily be the responsibility of the Port Commissioner. As both institutions are government ones it should not be difficult, however, to formulate the required administrative arrangements to ensure that the programme is carried out as a single unit. Further as the programme is both relatively large and speed is required it would be preferable to entrust it to an outside contractor. Finally, immediate financial considerations should not prevent the programme from starting in the next financial year. Once started, however, it may be possible to raise the bulk of the finance required by extra budgetary methods. Thus if the Port (Cargo) Corporation were to be given a government guarantee on its interest payments it could well be in a position to negotiate a loan abroad on its own initiative. The London market would be the obvious first choice but enquiries should not be limited to it. There are a number of capital markets which could easily finance the required amount. As the contract would presumably be let in as might at first appear.

TABLE VI

Phasing of Major Colombo Port Developments 1960–68

(Rs. million)

	1960	1961	1962	1963	1964	1965	1966	1967	1968	1959–68
Beira Lake Reclamation	2·00	4·00	2·00							8·00
Warehouses Elizabeth and Delft Quays	2·00	3·25	3·00							8·25
Warehouses, Customs Sales Sheds, &c.	·75	6·00	6·00	2·55						·3015
Beira Lake Barge Repair Yards	·75	1·50	·35							2·60
Kochchikade Piers and Jetties, etc.	4·00	10·00	20·00	18·00	8·00					60·00
Granary Projects Chalmers Quay						5·00	5·00	8·00		18·00
Total	9·50	24·75	31·35	20·55	8·00	5·00	5·00	8·00		112·15

Before considering other aspects of the development of the industry as a whole there is one further matter relating to the port of Colombo which should be considered. The port of Colombo has been nationalised. It has not yet, however, been transformed into a single administrative and economic unit. Some functions, without which cargo handling is impossible are, at present, functions of the Port Commissioner—e.g. the handling of the cranes. There are also other functions which are not perhaps so immediately a part of the cargo handling process for which responsibility should preferably be with those whose concern is cargo handling but which also lie within the province of the Port Commissioner. This situation is intolerable if the aim is to achieve the highest degree of efficiency in the port. Even with the best will in the world by both parties such a division of functions necessarily involves more time being taken on particular day to day decisions. In port management quick timing is often the essence of efficient management.

For the greater part of its first year of operation this situation has operated in the port of Colombo. With the recent change in Ministerial portfolios one step has been taken towards a solution of this problem. The two sides of port operation which were under separate Ministries are now in the same Ministry, that of Nationalised Services and Shipping. This should remove the main source of trouble stemming from dual control. It would probably, however, be of still further benefit if there was a further rearrangement of functions as between the Port Commission and the Cargo handling authority. It is in this way that the major benefit of a nationalised cargo handling industry—namely single unified control of operations—may best be achieved. Given the strategic position of the port in the general structure of the economy no source of potential increase in efficiency should be overlooked.

OTHER PORTS

While the immediate tactical problem in the sphere of ports is to increase the efficiency of Colombo, the long term strategy, as has been argued in the Technical Working Group's Report on Ports (pp. 47-52 of *Reports of Committees and Technical Working Groups,* 1959), is to reduce the economy's dependence on a single port. This is so for a number of reasons. Thus major technical break-downs ; strikes, and weather conditions, can easily disrupt the flow of goods through Colombo with considerable damage to the economy as a whole. Difficulties of this sort have, in fact, been the major reasons for the recent greater use of Trincomalee. In so far as a large part of the source of the particular troubles in recent years has been inadequate warehouse facilities in Colombo—the ships themselves having to perform this function at excessively high costs to the economy—and in so far as the measures just outlined will meet this problem, the question of the development of other ports is not as urgent as has sometimes appeared in recent discussions. There are, however, other longer term aspects to be considered.

First the volume of motor vehicle traffic generally in Colombo is reaching a stage where problems of the control of the flow of traffic are becoming acute. This trend can only at best be slowed down and then only by heavy investment in by-pass roads and major town planning projects. There is thus the prospect of increasing running and capital costs in organising the disposal of the larger volumes of goods, which may be expected in the future in the absence of port development elsewhere, after they have been discharged by the port authorities as such. The indirect costs of sole dependence on the port of Colombo could accordingly become relatively very high. Secondly one would expect that transport costs as a whole would be relatively lower if the flow of traffic is planned in terms of a few smaller regions instead of the country as a whole. Thus if Trincomalee served as the major port for the Eastern region and for some individual commodities for which it is particularly suited, Galle for the Southern region and Colombo for the rest, not only would there cease to be undue dependence on a single port but also the direct real costs of transport might be expected to be relatively lower and the indirect costs and social overheads substantially reduced.

It is for these and other reasons then that the Technical Working Group on Ports has recommended that immediate steps be taken to develop Trincomalee and Galle. While in the long run Galle may be expected to be the more important of these two ports it will take at least ten years before its required construction work can be completed. The cargo handling capacity of Trincomalee on the other hand can be expanded substantially in a matter of a few years. Given the immediate need for a second port to act as a back-stop for break-downs in Colombo ; the transport economies that can be expected from the development of Trincomalee in its own right ; its potential development as a free port and the general pressure on investment resources ; the best use of resources would be served by taking immediate steps to expand Trincomalee. The development of Galle into a major port should however, also be accepted as an objective. The minor development scheme which is already in progress there should be proceeded with. After its completion work should begin on the major development scheme. As this requires much detailed surveying, plan preparation, &c., only a small part of the heavy expenditure which will have to be incurred will be undertaken during the period of the plan itself.

There is one other minor port which deserves special mention here namely Kankesanturai. As is discussed in the Industry plan the expansion of the cement industry should have a high priority. One reason for the relatively high costs of domestic production in the past has been heavy transport costs. These could be substantially reduced by providing the Kankesanturai works with sea transport and by linking its development with the establishment of cement clinker grinding works in Galle. Given the importance of cheap cement in the context of the general development programme this project must then have a high priority.

The nature of and reasons for the development of fisheries harbours are discussed in the Fisheries Plan. Here it is only necessary to note that the phasing of expenditure has been altered to take account of the delays which have occured in its implementation. The importance of the development of fisheries and of their role in the Plan have been discussed elsewhere and need no further elaboration here.

The preceding policy recommendations for the development of ports and harbours are summed up in Table VII which gives the detailed investment phasing which is necessary for their implementation.

TABLE VII

Phasing of Investment Expenditure—Ports and Harbours 1959–68

(Rs. million)

	Replacement Port Equipment	*Colombo*	*Galle**	*Kankesanturai**	*Trincomalee**	*Fisheries Harbours*	*Total*
1959	9·0†		2·0				11·0
1960	5·0	9·5	2·0	·8	·5	1·0	18·8
1961	5·0	24·8	2·0	2·0	7·0	13·4	54·2
1962	6·0	31·3	1·0	1·6	13·5	13·4	66·8
1963	6·0	20·6	·6		9·0	15·4	51·6
1964	7·0	8·0	·2			15·4	30·6
1965	7·0	5·0	·2			15·4	27·6
1966	7·0	5·0	1·0			15·8	28·8
1967	8·0	8·0	7·0			15·8	38·8
1968	8·0		20·0			15·8	43·8
1959–68	68·0	112·2	36·0	4·4	30·0	121·4	372·0

*Further details of the investment phasing of these schemes are included in the National Planning Council *Reports of Committees and Technical Working Groups*, p. 56.

†This item has not been distributed amongst the various ports. It includes some new works but has been separated from the major development schemes.

Roads

In planning the development of the road system the aim has been to keep in view the demands of agriculture and industry. It has been necessary to make adequate provision for the demand for transport consequent to the opening up of irrigation and land development projects as well as the need for providing communications to those parts of the interior which have been so far lagging behind in development due to inadequacy of communications.

The demand for better roads becomes more and more pressing because bigger, heavier and faster vehicles are being produced in large numbers for the economic and speedy transport of passengers and goods. This results in a demand for wider, safer and better roads. There is heavy congestion, particularly on city roads, and consequent delay in travelling time and inconvenience to the public. The fact that roads are the arteries through which the life blood of the country's commerce flows makes it essential that high priority be given in the future to road construction and development. In road planning it is not sufficient to consider the present day traffic alone. It is necessary to consider the volume and nature of traffic in the future. It is necessary to lay down standards, widths and designs for each type of road. It is equally important to provide measures for the satisfactory solution of the problems of traffic congestion in urban areas.

The Public Works Department has charge of nearly all roads constructed and maintained by the State. The present classification which is functional, is as follows:—

(*a*) Trunk roads connecting provincial centres, major ports and airports ;

(*b*) Main roads connecting centres of District Administration (towns with Kachcheries or Courts), or forming important links with Trunk roads ;

(*c*) Main roads—all other P. W. D. roads not classified under (*a*) or (*b*).

In 1957 the P. W. D. maintained a total of 11,258.95 miles of road (classes (*a*), (*b*) and (*c*)). This excludes 21.29 miles of trunk roads maintained by the Colombo Municipal Council at the expense of the Central Government. Of the total mileage maintained by the P. W. D. 9,764.60 miles are motorable, 7,388.98 miles are bitumen-surfaced and 579.5 miles are metalled but not bitumen-surfaced. The general average spent on maintenance per mile of all P. W. D. roads in 1956/57 was Rs. 1,761.03 compared with Rs. 1,684 in 1955/56.

The present public highway system, constructed and developed gradually since the beginning of the nineteenth century, provides fairly direct lines of communication between towns of any importance and centres of population. The only parts of the Island to which that does not apply are some areas in the hill district, the undeveloped tracks in the North-Central and Northern zone, and parts of the Southern coastal belt which have only a meagre proportion of roads and are traversed mainly by jungle tracks and footpaths. In the opening up of community and other schemes in such areas, the provision of roads has generally been made with a view to serving immediate and limited objectives, without sufficient regard to standards or design in relation to the main highway grid. This situation has to be remedied.

ROAD USE

Road passenger transport which started about 40 years ago with a few hundred motor truck chassis fitted with a body for about a score of passengers on the average has swiftly developed beyond recognition and now uses 50 to 60 passenger vehicles, both single and double-decked. Its ramifications extend into a vast number of points in rural areas scattered over the length and breadth of the land, in which travel had been restricted previously to the buggy, the hackery and the travelling cart. In a short time the demand has arisen for the development of cart tracks and light surfaced roads into modern roads capable of carrying the loads imposed by the heavy and intensive traffic of our passenger buses. In a rather similar fashion and to an even larger extent has the road haulage industry developed. The annexed figures indicate how the goods haulage industry has developed in the last 30 years.

TABLE VIII

Growth of Road Goods Haulage Traffic 1929–1958

Year	*No. of registered Lorries*	*Year*	*No. of registered Lorries*
1929	2,818	1952	13,831
1934	3,218	1953	14,980
1939	4,408	1954	15,356
1945	5,200	1955	16,208
1949	10,286	1956	17,435
1950	11,160	1957	18,933
1951	12,227	1958	20,170

The result of all this has been an island-wide demand for more and better roads.

The most urgent need is for maintenance of the existing network of roads at a high level of efficiency. This should receive priority over the construction of new roads. The following are some of the problems with which need to be examined :—

(*a*) the general inadequacy of width of roads—in particular of the more important roads in the Colombo region, i.e., up to a radius of 15 miles from Colombo ;

(*b*) the inadequacy of roads in the Colombo region. In this connection a report was submitted by a Sub-committee of the Central Planning Commission which was constituted under the Town and Country Planning Ordinance, No. 13 of 1946. (The estimated cost of the proposals was over Rs. 200 million) ;

(*c*) the general weakness of road surfaces. The P. W. D. has appreciated this weakness and is surfacing the arterial road system of Colombo and beyond with premix asphalt laid to certain accepted standards but is short of funds ;

(*d*) weakness of bridges and culverts. It is reported that many steel bridges, even on main roads, are in imminent danger of collapse.

ROAD PLANNING

While the responsibility for planning the major part of our road system is vested in the P. W. D., according to present arrangements the planning of village roads is in the hands of District and Divisional Co-ordinating

Committees. Again, while the construction and maintenance of trunk roads in urban areas is in the hands of the P. W. D., all minor roads in urban areas are looked after by the local authorities themselves. The result of this situation is that roads are constructed by different authorities to different standards and this results in difficulties when the P. W. D. is asked to take over a road constructed by some other authority.

It is therefore recommended that a central and fully representative authority be established by statute to undertake the planning of roads. The proposed authority should contain representatives of all the departments and agencies concerned with road construction and have as its chairman the Director of Public Works. It is also recommended that representation on the authority be given to voluntary non-official organisations concerned with road construction and development.

As a preliminary to the building up of the road system on scientific lines the Technical Working Group on Roads and Road Transport recommended that a comprehensive traffic survey be initiated and it is understood that the Ministry of Transport has already taken steps to go ahead with this survey, with assistance from the International Co-operation Administration.

The highway system generally provides for single lane traffic. There are stretches on the arterial roads which have been widened for two lane traffic as a result of the pressure of growing demand; and just outside, Colombo is what may be called a demonstration model of some miles of dual carriageway, part of it still under construction. This will extend from Ratmalana to the junction of St. Joseph's Road within the Moratuwa U. C. limits. Such improvements have been effected gradually over a period of many years because, primarily, of financial considerations. A factor in this has, doubtless, been the more or less perfunctory evaluation of the investment returns of road improvement and development from the point of view of the country's overall economy. This evaluation would, of course, be a formidable task, but such analyses made in countries like the U. K., U. S. A. and many others have led to the disbursement of large sums of money on road construction and improvement which have shown that even modest expenditure on minor roads may bring surprisingly high returns in the course of a few years.

For quite a time to come single lane capacity will suffice for the requirements of many of the trunk and main roads. However, sufficient land widths should be secured forthwith for possible future increase in the number of traffic lanes. The aim should be to provide a minimum of two lanes on all trunk and main roads for future development, but an immediate improvement essentially for allowing single lane capacity to operate efficiently is the provision of wide shoulders and parking bays for halted vehicles especially in urban areas.

A feature peculiar to the Island which should be kept in mind when considering the application of experience gained in Western and other countries towards the solution of our traffic problems and the related subject of road development and improvement is the mixed type of traffic using our roads, ranging from high powered and speedy limousines and lumbering 6-10 to lorries to the clumsy, crawling bullock cart. Roads have to be sufficiently wide to accommodate this mixed traffic.

From a long term point of view it is essential that all public thoroughfares should have adequate road reservations. As a general rule the following reservations are recommended for adoption in regard to public thoroughfares :—

(*a*) Trunk and main roads—66 ft. on either side from the centre of the road ;

(*b*) minor roads—33 ft. on either side from the centre of the road ;

Roads bordered by Crown land, however, should have a reservation of 66 ft. from the centre line of the road irrespective of the class of road, and in the case of roads running through jungle areas, a further reservation of approximately one chain (66 ft.) width beyond the limits of road reservation on either side should be maintained as a "Green Belt". Permanent improvements, where permitted, should be set back beyond the outer edge of the reservation.

Finally it should be pointed out that the nature and rates of taxation upon road vehicles should be subject to further study. In this connection it is important to know the relationship between the revenue derived from taxation upon road vehicle and the expenditure upon roads. This is a matter that deserves investigation by an expert committee with terms of reference such as those recommended in the Report of the Technical Working Group on Roads and Road Transport. Such a committee would be able to assist in the determination of the relative spheres of road and rail transport after examining the true economies of each form of transport.

The scale and phasing of investment in roads and bridges that is recommended is given in Table IX. It is based on Ministry data submitted to the Technical Working Group on Roads and Road Transport which is presented in their Report.[1] As was mentioned on p. 429 some adjustments have been made in order to fit the road programme into the overall picture. In later years too the phasing is to a large extent dependent on the findings of investigations into the true relative transport costs in Ceylon. Finally it should be noted that maintenance expenditure is not included.

TABLE IX

Phasing of Investment Expenditure—Roads and Bridges 1959–68

(Rs. million)

	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1959–68
(1) Grant in Aid Colombo Trunk Roads	0·8	0·8	0·8	0·8	0·8	0·2	0·2	0·2	0·2	0·2	5·0
(2) Bridges—New and and replacement	4·0	5·0	7·0	8·0	9·0	11·0	12·0	13·0	15·0	16·0	100·0
(3) New Roads	9·0	10·0	11·0	12·0	13·0	14·0	16·0	17·0	18·0	20·0	140·0
(4) Improvements Roads, Traffic Flow &c.	5·0	6·0	6·0	8·0	9·0	9·0	11·0	13·0	15·0	18·0	100·0
(5) Improvements ; ex DRC, PRC, KPC and Minor Roads	8·0	8·0	8·0	8·0	8·0	8·0	8·0	8·0	8·0	8·0	80·0
(6) Preliminary Investigations and Designs	0·5	0·5	0·5	0·5	0·5	0·5	0·5	0·5	0·5	0·5	5·0
(7) Roads within Colonisation Schemes	2·3	2·6	3·2	3·2	3·6	4·3	5·1	6·1	7·0	8·6	46·0
(8) Approach Roads to Irrigation Schemes	2·0	2·3	3·1	3·4	3·8	4·2	4·6	5·0	5·4	6·2	40·0
Total	31·6	35·2	39·6	43·9	47·7	51·2	57·4	62·8	69·1	77·5	516·0

Note.—Based on data presented in National Planning Council *Reports of Committees andTechnical Working Groups*. pp. 24–28. Published by the Planning Secretariat.

Road Passenger Transport

Since the beginning of 1958 bus services in Ceylon have been run as a nationalised industry under the Ceylon Transport Board. The transition to government ownership was, given the administrative and technical resources available, a big and complex operation, and has been carried through with commendable skill. In an economy not used to large scale economic units it has naturally not been an easy process to weld a single unit out of a large range of varying sized smaller ones. It would be unwise then to expect results from the new unified system too quickly although they have begun to be felt and may be expected to continue to do so.

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[1] See "*Reports of Committees and Technical Working Groups* Planning Secretariat, 1959 (p.p. 24–48).

While nationalisation has then shown some of the results which were expected of it, it has not yet done so completely. This is partly, perhaps, because too much was expected of it and partly because the Board has not been able to operate fully in the manner of a business enterprise. Thus it has been faced with substantial increases in wages but has been unable, as yet, to make corresponding adjustments in its prices. No economic enterprise, public or private, can expect not to make financial losses under these circumstances. If the Board is to meet its statutory requirement not to make losses it must be given scope to raise its charges in the face of major increases in wages which are unrelated to increases in productivity within the industry.

In the context of the Plan the Board's lack of sufficient control over its financial policy has three important consequences. First it tends to result in consumer subsidies which must in one way or another be borne by the government. This in turn means, sooner or later (*a*) increased taxation on the people as a whole ; and, (*b*) from the point of view of the Plan's emphasis on developmental expenditures, a misallocation of resources. Secondly by being unable to set prices which take into account depreciation costs the Board is forced to make claims on the general budgetary resources to maintain an operating fleet. From one point of view this means greater claims on the government's investments expenditure resources. From another point of view it represents a failure to make use of the process of creating economic surpluses in order to finance investment. Thirdly, it must be recognised that efficient service cannot be provided when an economic enterprise is run on a shoe-string financial basis. The frequency of mechanical breakdowns is likely to increase, the costs of maintenance become excessively high and the real costs to the consumer, in terms of the poor quality of the service provided, are necessarily increased. This is important, not only as it means a negation of the benefits implicit in a unified bus service, but also because the Plan as a whole depends on efficient service in each particular sector. It is still more important in the sense that an efficient bus service is the cheapest way of providing for road passenger transport. If it is sufficiently efficient it will be used by all classes and the demands for expenditure on transport by private cars and taxis may be reduced. An efficient bus service could thus mean, on the one hand, a lower level of total consumer spending than would otherwise be the case and on the other the possibility of a lesser need for expenditure on roads and less costs in terms of the loss time which results from traffic congestion. For all these reasons the Board should be given much greater scope to adjust its financial policy. This means, very largely, greater freedom to adjust its prices.

There is one further issue which needs discussion. When an industry is a government monopoly as is Bus Transport in Ceylon the question arises should it be given freedom from the liability to pay customs duty on imports of capital equipment and on its fuel requirements ? In the case where duty is paid by the Transport Board on buses, the funds for the purchase of which have been provided by the Government, the effect of the payment of customs duty is nil in real terms. One government book entry has been credited. Another has been debited to an equal amount. If, however, the new capital equipment is for replacement and the funds have been provided out of depreciation reserves which have been built up by charging consumers a particular level of prices, then Government revenue is credited and there is a real payment by the private sector. In other words there would be a net loss to Government revenue if import duties were removed and prices which take depreciation fully into account adjusted accordingly. The payment of customs duties on fuel is comparable in effect i.e., it means a net transfer of revenue from the private sector to the Government. As the need for revenue is large during the implementation of the Plan and as bus transport is a consumption good which does not directly affect costs of production in other sectors there does not seem to be a case, in this instance, for the removal of the Board's present liability to pay the prevailing rates of customs duty.

In order to provide for necessary replacements and to meet the needs of an increased population—one which is expected to become increasingly urbanised—the investment needs of the bus service are expected to be of the order of Rs. 170 million over the ten-year period. The phasing of this expenditure is given in Table III. As has been mentioned, if the Board has control over its financial resources, the greater part of this expenditure can be obtained from its depreciation provisions.

Road Goods Transport

As has been remarked in the general discussion on roads most aspects of this field of transport cannot usefully be discussed until detailed investigations have been made into expected traffic flows and into the relative cost of this and other types of transport. In this situation it has, with one exception, been considered advisable here only to estimate the probable level of investment expenditure on commercial vehicles. This estimate, which has been based on the extrapolation of past trends in the growth of the numbers of registered vans and lorries and on estimated needs for replacement, amounts to Rs. 338 million. Its phasing has been given in Table III.

31—J. N. R 2359 (6/59)

The exception is the question of the regulation of long distance road haulage. This has recently been investigated in some detail (S. P. XII—1958 *Report on the Road Haulage Industry and its Co-ordination with Rail Transport*). The Planning Council Technical Working Group on Roads and Road Transport[1], however, advised against acceptance of the recommendations of this Commission without further investigation. It is not clear, however, whether in making this recommendation sufficient thought was given to the urgency of doing something towards checking the Railway losses. It may be doubted, at the moment, whether there is any justification for an outright prohibition on the carriage of any particular type of good by long distance road hauliers. It may also be the case that thorough investigation of relative costs would weaken the Commission's general case for regulation. It should not be forgotten, however, that the Railways are making increasing losses and that this is in no small part due to unfair competition by road-hauliers certainly through unsafe and illegal over-loading and possibly through inadequate wage payments. There are, thus, grounds for believing that immediate steps should be taken to alter the regulations relating to long distance road haulage along the lines indicated by the Commission (except in the case of total prohibition of certain goods which should be permitted along the lines recommended in item 4 of the Commission's findings). This would be subject to three provisos : first that permission be granted for the carriage of restricted commodities rather more leniently than the Commission implied ; secondly that emphasis be placed on a determined attack on over-loading abuses, and thirdly that the system of regulation be regarded as an interim measure pending the findings of the detailed investigation of transport costs and charges which is discussed elsewhere. Whether or not there is a case for raising wages in the road-hauling industry would presumably be decided in the light of the findings of the Commission which is presently examining the general wages structure.

Railways

When the railways were first laid down the only other form of transport was the bullock cart and the horse and trap, but today with the rapid development of road transport it is essential for the railway to modernise itself in order that it may retain and develop its traffic.

Most modern plans for railway development seek to exploit the great natural advantages of railways as bulk transporters. The chief aims of such plans are as follows :—

(a) the improvement of track, signalling and communications so as to increase line capacity ;

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[1] Ibid p. 20

(*b*) the replacement of steam traction by more modern means of motive power ;

(*c*) the replacement or improvement of passenger rolling stock and the improvement of passenger stations ;

(*d*) the re-modelling of freight services, the fitting of automatic brakes to all freight wagons ; the re-siting and improvement of marshalling yards and freight terminals, and the introduction of larger freight wagons and the consequent modernisation of loading and unloading appliances ;

(*e*) staff welfare, improvement of office mechanisms, development and research.

The proposals for the development of the Ceylon Government Railway include the following specific projects :—

(*a*) the development of the Colombo and suburban areas by the introduction of fast diesel trains and colour light signals. This programme is expected to be completed in about three years' time ;

(*b*) the re-laying of the Batticaloa-Trincomalee line with heavy section rails. This is expected to be completed up to Batticaloa in two years' time and up to Trincomalee in another four years' time ;

(*c*) general improvement to railway lines. This includes the re-alignment of the railway tracks to obtain faster speeds ;

(*d*) improvements to railway stations. This includes provision for bringing up the standards of facilities and amenities provided for passengers at railway stations ;

(*e*) a new terminal building at Fort Station. This is included in the improvements to the suburban service areas, but is mentioned as a separate item as the arrangement is to provide a passenger terminal for long distance passengers ;

(*f*) re-laying of the Bangadeniya-Puttalam line (28 miles). This is expected to be completed in 2½ years' to 3 years' time, depending on the delivery of the required materials ;

(*g*) improvement to locomotive and rolling stock. The present programme will be completed in five years' time. This provides for the purchase of 70 more coaches and 1,058 more wagons. This is in addition to the coaches that will be built for improving the suburban services. This also provides for the purchase of 45 suburban power units, of which 15 will be delivered within the next 12 months and the balance 30 within the next 12—24 months.

It is anticipated that during the next ten years the Railway will have to purchase 75 locomotives. It is proposed that the diesel locomotives be maintained up to about 50 per cent. of the total strength and no more. It is very desirable that the railway should not be dependent entirely on foreign supplies of fuel oil. Steam locomotives can, in an emergency, be run with firewood.

After the purchase of the above coaches and wagons it will be necessary to purchase 1,000 wagons during the second five years of the ten-year plan. Further coaches will also have to be renewed during the second five years due to being beyond economic repair. To take the place of the coaches whose useful life is ended, it is expected that a further 400 coaches will have to be purchased during the second five years of the programme.

(*h*) it is also proposed to extend the colour light signalling scheme over the present suburban limits on the coastline up to Galle, and on the other section up to Polgahawela, and modernise the Negombo line completely with colour light signals and long-sidings instead of duplicating the line as the combination of colour light signals with long sidings will meet the same purpose ;

(*i*) Housing schemes for staff : It is proposed to provide more and more houses each year and it is estimated that the total requirements of housing during the next 10 years would be in the region of 25 million ;

(*j*) no proposals for electrification are included in the plan ;

(*k*) minor improvements are undertaken at a cost of about Rs. 2 million annually. This is provided for under the heading, "General works" in the Estimates ;

(*l*) flood rehabilitation work is planned to be completed in three years' time.

The Technical Working Group on Railway Transport has recommended that no more extensions of the railway be undertaken before a comparative study of the relative costs of the proposed extension and the performance of the same transport task by another form of transport is made. It is only on the basis of such a comparison of the economies of the use of different forms of transport that decisions of this nature should be taken. In a small country like Ceylon it is important to conserve resources without frittering them away in the use of more expensive rather than less expensive forms of transport. This is not to say that previous extensions have not been justified but it is not now clear that they were made on the basis of adequate data. It is to remedy this situation that it is proposed that studies of this nature be undertaken—preferably by experts not actively associated with any particular transport agency.

Finally it should be stressed that to remain successful, progressive and efficient the Railway should maintain a competitive outlook as it is only by providing better service for both passengers and freight that it can attract more customers and thus increase the pace of its turnover.

It is partly for this reason that it has seemed preferable not to recommend for the railways a monopoly in the carriage of particular types of goods. It cannot be expected, however, for reasons similar to those made in relation to bus transport, that the most efficient service will be obtained while railway prices are kept at artificially low rates and railway financial losses continue to be made on the scale of the recent past. Until its low rates have been justified in terms of the desirability of such a subsidy as a means of promoting development—and this can only be done after detailed investigation along the lines indicated earlier—the Railways Department must necessarily, in the light of its financial behaviour, be regarded as a poor relation when investment resources are being shared out. This may or may not be the correct approach to take but so long as rational defence of its rates is not possible the railways are likely to be starved of funds with consequences which are likely to be seen in the perpetuation of inefficient services, in financial losses, and in a misallocation of resources.

Air Transport

GENERAL

There are two clear avenues for the development of aviation in Ceylon. One is to attract foreign air lines to call here by developing an international airport. The second is to develop the national airline.

In view of the fact that a large source of income for this country lies in the development of the tourist trade as many airlines as possible, with connections in all parts of the globe, should be encouraged to call here. In order to attract airlines to call here they must be provided with better facilities than those of the airports which are our closest competitors. The Technical Working Group on Air Transport has recommended that Katunayake be developed upto the standard of a first class international airport. In addition to providing the necessary facilities and amenities however, a change in our attitude towards the tourist is needed. Formalities must be reduced to a minimum. In this matter the example of airports like Shannon in Ireland and Schipol in Amsterdam, where formalities are almost non-existent and everything is done to please the passenger, should be followed.

In the matter of developing the national airline it is important that Air Ceylon should be able to stand on its own feet sooner or later. At the moment there are not sufficient trained personnel and equipment for it to venture out on its own. But it is essential that adequate personnel be trained without delay. It is therefore recommended that the facilities for the training of skilled personnel such as pilots, navigators, flight engineers and radio operators on the international service be intensified as soon as possible.

AIRPORTS

KATUNAYAKE

Katunayake Airport will be shared by the Civil Aviation Authorities and the Royal Ceylon Air Force on a joint-user basis. It will be Ceylon's International Airport. The Commercial Airlines operating into and through Ceylon have also indicated that they will, in the near future, be introducing more modern, larger and faster aircraft such as the Boeing 707, Comet IV, Conveyor 880 and Vickers DC 10. Katunayake Airport therefore requires to have its runway lengthened and strengthened to take these aircraft. In addition, other airport facilities will have to be provided, such as adequate communication and navigation aids, terminal buildings, hanger accommodation, apron and taxiways, car parks, approach roads, runway lighting and emergency services. Work has already commenced in preparing preliminary plans and estimates for this purpose and it is estimated that the cost of developing Katunayake Airport to present and future international standards would be in the region of Rs. 33 million. The first phase would cost Rs. 23 million and the second Rs. 10 million.

KANKESANTURAI AIRPORT

It is mandatory that an alternate standby airport to the main international airport of the country should be provided for use in case of emergency. Kankesanturai airport, when developed, will fill this role. The airport has a runway of 7,500 feet, which is sufficient for this purpose. 500 feet of the 7,500 feet need repairs and re-surfacing and it is also necessary to construct a taxiway and equip the runway with lights. It is estimated that the cost of this work will not exceed Rs. 500,000.

RATMALANA

This will be used mainly as a base port for the domestic and regional service and also as headquarters for the proposed Air Training Institute. No further expenditure on Ratmalana airport will be required in the next ten years except for normal maintenance.

INTERNAL AERODROMES

This country is studded with a large number of aerodromes which are a legacy from pre-war years. The only two internal aerodromes in regular use are Amparai and Kankesanturai. Work has already started at Amparai on a five-lakh project and the airstrip at Batticaloa has just been completed.

The essential pre-requisites for the inauguration of an economically feasible internal air service between two points are:

(a) absence of good surface communications;
(b) existence of good and growing traffic potential between two points;
(c) availability of suitable aircraft to fit into the route pattern.

Generally speaking, all these conditions are satisfied as between points on the East coast and Colombo, but the East coast is already serviced with three good aerodromes at Amparai, Batticaloa and Trincomalee and the question of establishing further aerodromes need not arise. In the case of Kankesanturai too the traffic potential certainly justifies its existence.

NUWARA ELIYA

It has been proposed that an internal aerodromes be constructed at Nuwara Eliya. The flying time between Colombo and Nuwara Eliya is half an hour. This appears very favourable as the travelling time both by road and rail is almost 6 hours. The service should be commercially attractive during the hot weather in March and April, i.e., the Nuwara Eliya season. The first class rail fare is Rs. 18.50, but in view of the fact that most of the traffic to Nuwara Eliya is of the luxury class a one way fare per passenger of Rs. 30 to Rs. 35 seems to be justified.

The following is the allocation of funds for the development of internal aerodromes :—

	Rs.
(*a*) Nuwara Eliya	700,000
(*b*) One aerodrome for the South	500,000
(*c*) Terminal facilities and other equipment for Trincomalee, Anuradhapura and Batticaloa	450,000

INTERNATIONAL SERVICE

It has been decided that Ceylon should continue to operate an international air service. The best answer to those who doubt whether there is any justification for a small country like Ceylon to operate an international service can be given in the following words of Sir George Cribbet, Deputy Secretary in the Ministry of Civil Aviation, United Kingdom.

> " It may well be asked why countries less equipped to engage in international air transport did not postpone their entry into the arena, or if they had entered, retire from it rather than face heavy subsidy charges on their taxpayers during the period of infancy of the industry. The answer is clearly that all countries with a sense of sovereign and economic consciousness had come to realise that air transport was an instrument of national policy. Major powers regarded air transport, like their mercantile marine, as an important ancillary to national defence. The United States, in the Civil Aeronautics Act, 1938, openly acknowledged the importance of civil air transport to national defence and made provision to subsidise its development from mail revenues. Other countries unable to maintain a scale of effort to make a significant contribution to their national defence, were impressed with the importance of air transport to the maintenance of their national prestige. No country with important international trading relations could afford to neglect to show its national airline flag ".

The development of the international service will, in the future, bring great dividends to this country by the development of tourist traffic. It is essential that Air Ceylon and the Tourist Bureau work in close liaison. At the present moment the international service is operated in conjunction with KLM Royal Dutch Air Lines. It is believed that the country is getting the maximum benefit from the link-up with KLM. Air Ceylon does not wish to commit itself at this stage to the purchase of any particular type of aircraft, in view of the fact that as a small carrier it would prefer to benefit by the experience of others who are experimenting with jet aircraft. In the event of a loan being floated by Air Ceylon for the purchase of aircraft for the international service, the Government may be required to give a guarantee for its repayment. No further financial assistance will be required for Air Ceylon from the Government.

REGIONAL AND INTERNAL SERVICES

EQUIPMENT

Air Ceylon's regional service operates the following services :—

(*a*) Colombo-Jaffna-Madras ;
(*b*) Colombo-Amparai-Jaffna-Trichinopoly.

The services are operated with two DC 3 aircraft, which are approximately 20 years old. While these aircraft have proved extremely satisfactory in the past and are still rendering fairly efficient service, they will have to be replaced in the near future. In the circumstances it will be necessary to purchase either two twin engine Fokker Friendship F 27 aircraft or other aircraft of the most modern type with similar performance. The cost of the above-mentioned aircraft is in the region of Rs. 3 million each.

The disastrous floods in December 1957 and the recent riots have emphasised the need for adequate air service in time of emergency. The possibilities of other means of communication not being available have been realised on both occasions and the state as well as civilians, have had to rely mainly on air transport, both for the carriage of essential personnel and vitally needed freight.

CIVIL AIR ACADEMY

The Minister for Transport & Works appointed a Committee to examine the working of the Air Academy and submit proposals for its reorganisation. The Committee has made an estimate of the capital expenditure required for the efficient functioning of a fully equipped air training institute, which is included in the Plan investment outlays. There is no future for aviation in this country unless an organisation of this nature is maintained by the Government.

SEARCH AND RESCUE OPERATIONS

Ceylon is committed to provide search and rescue facilities in the region allocated to her and it is therefore necessary to obtain aircraft for this purpose. The Royal Ceylon Air Force agreed to operate these aircraft. The cost of providing this necessary facility is about Rs. 2 million using suitable amphibian aircraft. While no financial return could be expected from an undertaking of this nature, the aircraft would be of very great assistance in times of national emergency, such as floods, riots, &c.

The details of the investment programme implied in the above recommendations are given in the Report of the Technical Working Group on Air Transport[1]. The phasing of this expenditure is presented in Table III.

Posts, Telecommunications and Ancillary Services

In a modern economy efficient postal and telecommunication services are essential. If these are not available time will be lost in all spheres of economic life. Undue waste of time is a real cost and involves financial losses. It can also affect Ceylon's standing as an international trading nation. As far as possible then the intention must be to maintain efficient services in this field.

The urgency of the need for greater expenditure than has been the case is indicated by the following comment of Mr. S. W. Dobbs of the U. K. Telecommunication Team who reported as follows:

" In general, not nearly enough money has been spent over the past few years in developing telephone facilities in Ceylon. As a consequence, the system is slowly grinding to a halt, and once this is allowed to happen it will take several years to rectify the position, even supposing that an unlimited amount of capital were forthcoming. It does not seem to be sufficiently appreciated that the provision of (*a*) exchange equipment (*b*) local cables (*c*) switchboard position and (*d*) trunk lines must all be kept in step, or the public will not be given satisfaction and much capital could be locked up without producing a proper return. At present more subscribers are being connected but the trunk lines have remained almost constant for a long time; if this continues the trunk service, already bad, will simply get worse ".

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[1] Ibid. pp. 44–46

The original departmental estimates have been revised downwards slightly in the context of the general demands on investment resources. The recommended allocation of expenditure is then as follows:

TABLE X

Investment Expenditure on Postal, and Telecommunication Services 1959–1968

		(Rs. million)
1.	New Exchages for Colombo area	47
2.	Mail Sorting Office Building	3
3.	Development of Overseas Telecommunication Service	10
4.	Training School for Postal and Telecommunication Service	1
5.	Posts and Telecommunication Stores Building	1
6.	Underground Cables, High frequency links and trunk and junction lines	50
7.	Exchanges &c. for outside Colombo Area	26
8.	Outstation Post Office Buildings	9
9.	Frequency testing and maintenance of Radio Transmissions	1
10.	Workshop Building	1
11.	New Medium Wave Broadcasting Station	3
12.	Development of Meteorological Services	1
		153

The phasing of this expenditure is given in Table III.

Summary of Major Recommendations

1. The most urgent transport need is to improve the efficiency of the port of Colombo. No delay should be permitttd in implementing the detailed proposals recommended in this report.

2. The question of an adequate pricing policy for both railways and passenger road transport should be given considerable thought both because of the general budgetary need for expenditure on investment rather than consumption and because a reduction of losses is likely to lead to more efficient services in both the short and the long run.

3. A statatary board should be established to regulate, co-ordinate and conduct research into the general problems of transport policy in Ceylon.

4. Whether or not the statutory body is set up a detailed inquiry into the economics of transport in Ceylon should be made as a matter of urgency. Pricing policy and the required relative rates of investment in the different fields of transport should subsequently be determined in the light of its findings.

CHAPTER 11

SOCIAL SERVICES

THE social services are identified with (i) health (ii) education, (iii) housing, (iv) other welfare services such as poor relief, assistance in sickness, unemployment, old-age, &c. In Ceylon an important item under the fourth head is the consumer food subsidies on which a very large amount is spent. It is appropriate to call them social services because they are largely financed by the State or private charity; in other words, there is a large element of social transfer characterising them. This particular feature makes them an important and accepted instrument for the promotion of economic equality and social justice.

It is not easy to assess a country's investment needs in social services. The social services are, directly at least, consumer services. A greater output of consumer goods is, of course, the final end and aim of all development, but for the very purpose of realising this end quickly, the economy must set apart as large a portion as possible of its resources for the production (or importation) of capital goods which only would help further production. This need is all the greater in an under-developed economy which must force the pace of development.

The social services must not only compete for resources with the production of capital goods, but also with the production of other essential consumer goods and services (like food, clothing, defence, law and order, &c.). In some cases the production of some of these consumer goods might have some developmental advantages which the production of social services would lack. For instance, the production of rice or textiles might help the country to save or earn foreign exchange which in its turn could be used for importing capital goods. To that extent therefore the production of these goods would be equivalent to the production of capital goods. Again, since the social services are generally subsidized and not supplied at a profit, they offer no scope for the direct creation of an economic surplus which could be used for re-investment.

Finally, the production of most of these services (housing is an exception) requires large operative or current costs. In other words, the capital outlay itself may give no idea of the total draft that must be made on the community's resources to provide the service. To extend health services for instance we would have to provide not only buildings but also adequate staff. Similarly, the main cost of the establishment of a new school might be staff and not buildings. In planning investment for these services, this further recurrent demand on national resources must be kept in mind.

Despite these issues, however, there are considerations which suggest that social services should obtain a place of importance in a Plan. In the first place, though they are consumer services, they are often so essential that every society must provide them to some extent even if this means some diversion of resources from the production of capital goods and a slowing down of the rate of development. Actually, development itself would have little meaning if the people working for it are denied their essential needs. No promise of future abundance can be a compensation for the current denial of basic wants.

Secondly, and this is equally important, the services are really more than consumer goods; they are also substantially, though indirectly, capital goods helping to increase production. Education, for instances, has proved to be one of the greatest instruments of development, not only in improving skills and technologies but also in modifying social institutions and attitudes more favourably for development. Investment in health likewise is largely investment for raising production. Regarding housing also, it can hardly be denied that inadequate or poor housing affects the health, efficiency and morale of the people, undermining productivity. There is a minimum investment in housing which is essential for productivity purposes. Finally, investment in these services, particularly for instance in housing, may contribute substantially to employment and to the creation of other industries.

Third, and this is indeed the decisive factor, it is impossible to ignore the pressures imposed by rapid population growth. Population expansion involves a continued increase in the numbers of school going age for whom schools and other educational facilities have to be provided; it involves a continued increase in the number of families for whom houses have to be built ; and together with general development and a rising rate of urbanisation it also involves increasing claims on systems of health, water supplies and sanitation for which commensurate measures have to be taken.

For all these reasons the place of the social services in a realistic Plan cannot but be an important one.

Ceylon is already maintaining relatively high levels of expenditure in the field of social services. Some evidence of this is provided by a comparison, given in the two tables below, of government current expenditure on social services in Ceylon and other countries of South East Asia. It is true that the comparison relates to only current expenditure and that also of governments, but government is the main purveyor of social services and current expenditure is closely related to capital expenditure. In the absence of more direct information, the figures may be taken as a good index of a comparative investment in social services in the countries concerned.

TABLE I

Government Current Expenditure on Social Services (excluding subsidies) as per cent. of total Government Expenditure, 1953–54 to 1957–58

Countries	*1953–54*	*1954–55*	*1955–56*	*1956–57*	*1957–58*
Philippines	26·30	30·91	27·35	26·02	26·55
Ceylon	30·04	28·12	25·68	25·74	26·0
Malaya*	14·74	15·78	17·61	19·53	21·38
Burma*	8·91	10·37	12·72	12·05	11·44
India (Centre and States)	9·76	10·01	10·25	9·98	9·57
Thailand*	9·57	8·19	7·06	7·69	8·62
Pakistan*	·99	1·68	1·52	1·49	1·42

*The figures for Malaya and Thailand are for calendar years 1953 to 1957.

TABLE II

Government Current Expenditure on Social Services (excluding subsidies) as per cent. of Gross Domestic Product (at factor cost) 1953–54 to 1956657

Countries	*1953–54*	*1954–55*	*1955–56*	*1956–57*
Ceylon	5·59	5·49	5·59	6·53
Philippines	2·75	3·44	3·27	3·21
Burma	2·36	2·85	2·91	3·15
Malaya	2·50	—	—	—
Thailand	1·52	1·54	·96	—
India	1·03	—	—	—
Pakistan	·10	—	—	—

Note.—Except for Malaya and Thailand Government expenditure on Social Services are for fiscal years, while the Gross Domestic Products are for calendar years. For Pakistan the ratio is to Net Domestic Product.

SOURCE : *ECAFE Economic Survey for 1957 UN Year Book of National Income Statistics*

The tables show that Ceylon's expenditure has been much higher than in most other countries. In other words, through capital and current expenditure Ceylon has been maintaining social services at a higher level than in these countries. The task of the future is to safeguard these advances in the face of a rising population.

Programmes Recommended

In the sections that follow we discuss the investment needs of the different services and suggest investment allocations for each. The basic factor underlying these allocations is that of population growth. Obviously the programmes of expansion for health, housing and education must measure up to the requirements of a rising population. It is important therefore to relate these programmes and the magnitudes concerning them to projections of future population. This has involved some recasting of departmental programmes which are usually not based, except in a general way, on this approach.

The allocations provided are for the whole economy, with tentative divisions between the government and the private sectors. Here as in other fields of investment, we have left the division to some extent open, because (*a*) it has not been finalised yet and (*b*) it is not, from the development angle, the most important issue. The most important issue at this stage is how much the economy should invest in the field, not what particular agency (state, co-operative or private) should do the investing. At present, however, except in housing, the government is by far the predominant supplier of these services. Planning for the economy as a whole therefore means planning largely in terms of the government sector. At the same time there remains much scope—it would be desirable to explore this—of shifting some part of the burden of the social services from the Central Government to local bodies and voluntary institutions as well as to those sections of the community who could afford to bear it.

HEALTH

Government has paid great attention to the development of its Health Services. Per capita expenditure (current and capital combined) [1] on this head has steadily grown. While it was Rs. 8.37 in 1948-49 it rose to Rs. 12.48 in 1957-58. The 1958-59 estimates provide for an expenditure of Rs. 14 per head. Few under-developed countries can boast of such high rates of expenditure on health.

The expenditure has been a good investment. A wide and efficient range of facilities, both on the curative and preventive sides, has been created. Malaria which was once a great scourge has virtually been stamped out. Epidemics of such fell diseases as cholera and plague have also become unknown. The general expectation of life at birth has been raised to 60 years. The annual death rate has been lowered to about 1 per cent. In these respect Ceylon may now claim standards approaching those of the industrially advanced countries of the West.

What rates of capital expenditure have achieved these results? An analysis for the period 1951/52—1956/57 is given in the table below. Only Government expenditure is shown, but this can virtually be equated with the expenditure of the whole economy since in this sector private expenditure is virtually insignificant. The figures cover estimated capital expenditure from all sources (revenue budget, extra-budgetary revenues, loan fund and foreign aid) by both the Ministry of Health and the Ministry of Local Government. However they also include some expenditure on housing (which should strictly be classed under housing) and on purchase of land (which is not investment at all from the nation's point of view).

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[1] Capital expenditure identified with Loan Fund Expenditure.

TABLE III

Capital Expenditure on Health, 1950–1 to 1956–7

	1950–51	*1951–52*	*1952–53*	*1953–54*	*1954–55*	*1955–56*	*1956–57*
Capital expenditure (*) (Rs. '000)	6,200	6,700	10,400	13,000	18,700	21,600	20,100
Mid-year population (†) ('000) (*1951*)	7,876	8,074	8,290	8,520	8,723	8,929	9,165
Increase in population ('000)	—	198	216	230	203	206	236
Incremental capital expenditure per person (Capital Exp./Increase in population) Rs.		33·8	48·1	56·5	92·1	104·9	85·2

(*) Estimates by Central Bank
(†) Figures from Statistical Abstract

Taking the whole period, the incremental capital expenditure per head works out at Rs. 70.1. In this context it seems to us that for the plan years an average incremental expenditure of the order of Rs. 133 per person (which is roughly 30 per cent. more than in 1955-56, the year of highest expenditure) would not only ensure existing standards but also permit reasonable expansion in the fields where progress has been hitherto relatively slow. It would also not strain the community's available resources too much, prejudicing the development of the other sectors of the economy.

In certain respects, it may be pointed out, national health costs would be likely to fall in the plan period. First, as the living conditions of the people improve with economic development (less unemployment, higher per capita income, &c.), health conditions would automatically tend to improve. Secondly, years of generous expenditure have already endowed the nation with good institutional facilities in certain fields, particularly in hospitals and dispensaries and investment in the field may well be now slowed down to some extent. Third, there would be, as in many other fields, considerable scope for (*a*) adoption of utility, even austerity standards in buildings and equipment, and (*b*) transfer of an increasing part of the burden to community self-help. However, on the other hand factors like the growth of urbanisation and industrialisation would tend to create new health problems and call for increased expenditure. On balance, the suggested investment of Rs. 133 per head should, in our opinion, cover the country's needs satisfactorily. Taking the probable increase in population in the period (3.356,000) [1] this would call for an aggregate investment of Rs. 446 million.

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[1] Mid-year population—1958— 9,803,000
in 1968 13,159,000
(Estimates based on figures in '*Population Projections for Ceylon 1956–1981*' Planning Secretariat 1959)

Regarding priorities, the Health Ministry has already announced in its "Preliminary Statement of Policy" that it proposes in future to give more emphasis to the development of environmental sanitation (water supply, drainage, sewerage, &c.) than to the expansion of curative facilities (hospitals, dispensaries, &c). We think this shift in emphasis is very well advised. Hitherto more attention has been given to the expansion of the curative side than to the preventive side with the result that there are important gaps in the latter. It is now time to fill up these gaps. Not the least difficulty in planning further ambitious expansions on the curative side would be the shortage of trained medical personnel. It is estimated that the Department of Health Services requires 526 specialists of various types (medicine, surgery, radiology, &c.) whereas the number available is only 195[1].

Government has not yet drawn any health plans covering the whole of the next ten years. The Ministry of Health has a programme for the next four years which is summarised below :—

TABLE IV

Summary of Four Year Programme 1959–60 to 1962–63

(*Rs.*'000)

	Investment already committed	*Additional investment*
New institutions (hospitals)	19,000	6,000*
Major extensions (to hospitals)	10,500	6,000
Other extensions	9,000	12,000
Training schools	6,500	1,000†
Water supply and sewerage	—	12,000
Electricity	—	2,000
Grants for wells and latrines	—	8,000
	45,000	47,000

* Includes : Secretariat for Ministry and Department Rs. 3 million

† Nurse Aids Schools for Colombo South Hospital Rs. 1 million

The programme provides for a total capital expenditure of Rs. 92 million or an average of Rs. 23 million a year. The Ministry's capital expenditure (Loan Fund Expenditure) programme in 1958-59, the fiscal year which corresponds largely to the first year of the Plan, is Rs. 17.6 million.

In addition to the Health Ministry, the Ministry of Local Government has the following capital expenditure programme on Health items :

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[1] Report of the Technical Working Group on Skills in. *Reports of Committees and Technical Working Groups.* Planning Secretariat, 1959.

TABLE V

Water Supply, Sewerage and Drainage Schemes

Project	Stage of Handling	*Approximate Expenditure up to 30.9.58*	*Estimated Expenditure 1958/59*	*Balance Expenditure in 1959–60 and after*	*Total Cost*
			(*Rs. '000*)		
A. Water Supply Schemes					
(*a*) Municipal Areas	Committed Schemes	1,700	10,640	19,714	32,054
	New Schemes	—	—	2,422	2,422
(*b*) Towns South of Colombo					
Dehiwala Kolonnawa Moratuwa — Stage I	Committed Schemes	28,578	12,359	1,513	42,450
Panadura Kotte — Stage II	Committed Schemes	200	1,000	20,600	21,800
(*c*) Other Urban Areas	Committed Schemes	1,600	7,649	6,494	15,743
	New Schemes	—	—	11,109	11,109
(*d*) Town Areas		121 485	700	5,795	2,654 4,447
	Total	32,684	32,348	67,647	132,679
B. Sewerage Scheme					
Towns South of Colombo to serve Kolonnawa, Kotte, Dehiwela-Mt. Lavinia and and Moratuwa	Details not ready Preliminary Report by Husband & Co.	—	150,000	150,000	150,000
C. Drainage Scheme					
Urban areas Town areas Village areas	New Schemes	—	1,125	1,016	1,118 932 91
			1,125	1,016	2,141

284,820

Full details of many of these proposals have not yet been worked out. They are therefore in various degrees provisional. In the light of the aggregate investment on health of Rs. 446 million provided for in the Plan, these Ministry proposals will have to be in various degrees adapted to fit into this target. Of the total, considering the nature of the fields covered by the two Ministries, a sum of Rs. 220 million has been allocated to the Ministry of Health while the balance Rs. 226 million is allocated to to the Ministry of Local Government.

On a broad view of needs and resource availabilities, the following phasing of the investment is suggested :—

TABLE VI

Phasing of Investment in Health, 1959–1968

	(Rs. million)		*(Rs. million)*
1959	28	1964	45
1960	33	1965	49
1961	36	1966	53
1962	39	1967	58
1963	42	1968	63

Total Rs. 446 million.

But this phasing is provisional and may have to be altered as details of the projects are worked out.

EDUCATION

Investment in education will have to be planned in the light of the growth of the pupil population and the country's changing needs for different types of education (general, technical and university).

The probable strength of the school-going population in the plan period is estimated as follows:—

TABLE VII

Estimates of School-going Population, 1959, 1963 and 1968

	1959	*1963*	*1968*
1. Population projection (5-14 years)	2,665,700	3,047,700	3,458,700
2. Estimates of school-going population (5-14 years)	1,865,990	2,133,390	2,421,090
3. Estimate of school-going population (below 5 years and over 14 years)	373,198	426,678	484,218
4. Estimate of total number of pupils on roll (2 plus 3)	2,239,188	2,560,068	2,905,308

Notes.

1. Figures based on projection in "*Population Projections for Ceylon*, 1956–1981"—Planning Secretariat 1959.
2. Estimated at 70% of total population between 5-14 years (This was the 1952-1957 average)
3. Taken as 20% of (2) on the basis of the average for the period 1952-1957.

The total number of pupils in schools in 1958 is estimated at 2,009,000. This means that by 1968, there would be an increase of 896,000 in the school-going population. If the participation rate increases, the number would be larger. It is assumed that the participation rate would remain unchanged. While the whole of this number (896,000) would seek education at school level, a proportion of them, larger than at present, will have to be in addition given opportunities for technical and university education.

The problem is to consider what capital investment such a programme would be likely to call for. It would be interesting to know in this context what capital expenditure Government has been actually incurring in recent years for each extra pupil. This would help to give an idea of the investment that would be required in the plan period. The following table gives an estimate of this expenditure. No information is available on the private sector's expenditure but it would perhaps not exceed 5 per cent. of the total.

TABLE VIII

Government Capital Expenditure in Education, 1950/1 to 1956/7

	1950/1	*1951/2*	*1952/3*	*1953/4*	*1954/5*	*1955/6*	*1956/7*
Capital expenditure* (Rs. '000)	18,500	28,600	29,300	17,100	14,000	20,700	26,600
Pupils on roll (mid year) in schools ('000)†	1,446	1,496	1,572	1,619	1,659	1,720	1,879
Increase in pupils on roll ('000)	—	50	76	47	40	61	159
Incremental capital expenditure per pupil in school (Capital Expenditure/increase in pupils) (Rupees)	—	572.0	385.5	363.8	350.0	339.3	167.3

* Estimates by Central Bank.

† Administration Reports of the Director of Education.

It should be explained that the figures cover capital expenditure financed from all sources, viz., the revenue budget, Loan Fund, extra-budgetary funds like the National Development Reserve and foreign aids. They thus give a fuller picture of the investment than merely figures of Loan Fund Expenditure. On the other hand the figures include some expenditure on staff quarters which should be classified under housing, not education. They also include expenditure on land acquisition which, from the nation's point of view, is only a transfer of an existing asset, not new capital formation. It is not possible to eliminate these items completely, but obviously if they could be eliminated, the figures would be lower.

The table reveals that taking the whole period, incremental investment per pupil was Rs. 363. Whether and how far this figure should be increased in the Plan would depend largely on two considerations, viz., (i) what emphasis should be put on practical, technical and scientific education as against general, and (ii) what scope there is for introduction of economies.

Regarding (i), a larger supply of technical skills is obviously one of the most urgent needs of the economy. As the World Bank Mission Report has observed, "development has been limited less by finance than by technical skills. To carry out the various projects there are not enough research scientists, designing and operating engineers, agricultural and manufacturing specialists, or construction engineers. Equally scarce are technical supervisors, draughtsmen, control chemists, field foremen, tractor operators, and even skilled workmen". A survey which was conducted by the Planning Secretariat in 1958 gave some idea of the extent of the shortage at least in one strategic field, viz., supply of engineers. It showed that 190 vacancies were unfilled. Apart from this backlog 170 more engineers were needed in the next four years to cover retirements and normal expansions of work. Against this demand, the expected output of engineers from the University in the next three years was only 104. The demand of course would tremendously rise when the development plans that are recommended begin to be implemented. The Plan will also call for specialists in different fields of engineering (such as chemical, marine, refrigeration, electronic, agriculture and production engineering) in which no training facilities exist at present in the country.

Reviewing the position generally the Planning Council's Technical Working Group on Skills (which has just reported) concludes "there are serious shortages of adequately trained personnel in practically all the skilled trades and many fields at the professional, technical and vocational level".

Obviously the educational system must now be more aggressively geared to the needs of development with a greater bias to technical and scientific education. This would require greater provision for technical and practical courses in schools (the present curriculum is unduly academic) and a larger flow of pupils into higher technical and scientific courses in specialised institutions and universities. Since technical and scientific education is more capital-intensive than general or arts education, provision must be made for a higher rate of investment per student than in the past. As far as purely general education is concerned no increase in the rate would seem to be necessary, as the standard of this education in Ceylon is considered already very satisfactory, certainly more satisfactory than standards in many other under-developed countries.

Regarding (ii), there would seem to be considerable scope for economy both in construction of and use of buildings. The tradition so far appears to have been to invest rather lavishly in buildings. More utilitarian standards may well be adopted now. The available buildings may also be more fully utilised by working more than one shift. Again in many cases, particularly in rural areas, community self-helf may be mobidized to put up buildings and equipment, thus reducing at least the financial cost of the project.

On balance, it seems that an investment of the order of Rs. 446 by the economy (Government and private sectors together) for every extra pupil joining the school population would adequately meet the needs of general, technical and university education in the plan period. This is nearly 25 per cent. more than the incremental Government investment per pupil in the period 1951/52-1956/57. We may add that even for a developed country like the Netherlands where great stress is laid on technical and university education, an incremental investment of Rs. 451 per school-going pupil has been considered sufficient for the period 1950-1970 [1]

At this proposed rate of investment per pupil, the total investment in education in the plan period would be approximately Rs. 400 million. The bulk, perhaps 95 per cent. of it would be in the public sector.

The Ministry of Education has not yet made any detailed plan for education covering the whole of the next ten years. Its present proposals, summarised below, do not extend beyond the next four years and also are neither fully costed nor clearly phased. Their 'output' in the sense of the number of new institutions and the number of pupils covered, has also in many cases not been estimated. (Even where cost figures have been given, they include costs of housing for staff and of land which should be excluded. In some cases, no details at all have been worked out).

The existing projects for the Department of Education (which may be broadly described as the Ministry's plans for school education) are as follows:—

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[1] *An exploration of the potentialities of the Netherlands 1950–70.* **Central Planning Bureau. The Hague—1956.**

TABLE IX

Summary of Estimated Costs of Projects of Education Department 1958/9 to 1962/3

(*Rs. '000*)

Project	*1958/59*	*1959/60*	*1960/61*	*1961/62*	*1962/63*	*Total*
Playgrounds	200	1,100	1,100	1,100	1,000	4,500
Greater Colombo Scheme	—	5,652	7,908	4,850	—	18,410
Dental Clinics	—	122	—	—	—	122
Building for Training Teachers, English	—	1,250	1,250	—	—	2,500
Building for Training Teachers, Science	—	2,500	2,800	—	—	5,300
Building for Training Teachers in Handicrafts	—	500	500	—	—	1,000
School Workshops	1,160	1,160	1,160	1,160	1,160	5,800
Science Laboratories	5,050	5,050	5,050	5,050	5,050	25,250
Primary and Post Primary Schools	10 000	13,000	13,000	12,000	12,000	60,000
Academy of Physical Education	—	2,345	405	235	—	2,985
Schools for the Blind in Kandy and Galle	—	1,150	1,150	—	—	2,300
Hostel Accommodation for Science Scholars	4,000	4,000	4,000	4,000	—	16,000
Additions to Training Colleges	2,500	2,500	1,250	1,000	1,000	8,250
Education Offices in Colombo and Outstations	—	1,750	1,750	1,750	1,985	7,235
Quarters for Circuit Inspectors	—	1,500	1,500	1,500	—	4,500
Quarters for Assistant Director, Education Officers and District Inspectors	—	1,080	1,000	1,000	1,040	4,120
Quarters for Assistant Engineers and School Works Inspectors	—	450	450	450	450	1,800
Quarters for Clerical Staff, Inspectors of School Works and Overseers	—	7,500	7,500	7,500	7,500	30,000
School Libraries	—	11,000	11,000	11,000	11,000	44,000
Duplicators and Typewriters	—	6,000	6,000	—	—	12,000
	22,910	69,609	68,773	52,595	42,185	256,072

The table below presents the Ministry's plans for technical education :—

TABLE X

Technical Education, 1958–59 to 1962–63

(Rupees '000)

Project	*1958/59*	*1959/60*	*1960/61*	*1961/62*	*1962/63*	*Total*
Six Junior Technical Schools	1,485	2,905	420	—	—	4,810
Trades School	1,000	3,157	—	—	—	4,157
College of Science and Technology		(Details not available)				
College of Commerce	—	107	—	—	—	107
Technical Teacher Training Centre		(Details not available)				
School for Food Processing		(Details not available)				
	2,485	6,169	420	—	—	9,074

The Ministry's existing plans on university education are given below. One important omission it will be noticed is that they do not include any provision for the two new universities established this year. Clearly they would also require sizeable capital grants.

TABLE XI

University Education, 1958–59 to 1962–63

Project	*1958/59*	*1959/60*	*1960/61*	*1961/62*	*1962/63*	*Total*
University				(Rupees '000)		
Buildings for second Medical College	10			(Details not available)		50,000
Constrution of Faculty of Engineering	500			(Details not available)		4,157
Duplication of Faculty of Science	4,000		Nil			4,000
Development of the University Scheme				(Details not available)		50,000
						108,157

In view of the fact that these plans are undefined and incomplete in many ways, it is difficult to say how far they satisfy the two criteria of (*a*) providing fully for the growth of the student population, and (*b*) giving adequate emphasis to technical and scientific education. A general consideration of these criteria has already suggested a capital expenditure of the order of Rs. 400 million for the next ten years. It is recommended that this figure be accepted as the aggregate investment on education in the Plan. To realise this investment target with increased emphasis on science and technology, the existing plans of the Ministry would have to be modified in various degrees and new projects framed to cover the rest of the plan period.

The phasing of the investment should broadly follow the growth of the school-going population. On this basis the following phasing is suggested. It is, however, necessarily provisional, since many details of the programme are yet to be worked out.

TABLE XII

Phasing of Investment in Education 1959–1968

	(Rs. million)		*(Rs. million)*
1959	22	1964	40
1960	24	1965	45
1961	27	1966	51
1962	31	1967	58
1963	35	1968	67

TOTAL Rs. 400 million.

In addition provision will have to be made for current expenditures which form the major part of the cost of education. The Plan provides for an overall increase in the current expenditure of the government (government consumption) of Rs. 323 million by 1968. This covers all activities including education, health, administration and defence. Current expenditure on education must come out of this total provision.

HOUSING

Housing deserves a high priority in the Plan. As already emphasised, it is like food and clothing a basic necessity. It is also an indispensible producer good in the sense that unless the country's minimum housing needs are met, the health, efficiency, and morale of the people would be adversely affected reducing productivity. Another point is that unlike in health and education where investment in the past has been generous, house construction has considerably lagged behind needs. This large backlog also must be satisfied. There is also the unrelenting pressure of population growth. It is therefore inevitable that the Plan should provide for a large allocation on housing. It is actually one of the largest sector allocations in the Plan.

It is not easy to measure the housing needs of a country. A very rough method is to take a certain number of persons per house as a norm. It is certainly not a satisfactory method because it takes no account of the size or quality of the house, but it is the only basis on which some assessment of housing needs in the country can at this stage be made at all, pending more accurate definitions of needs and more dependable housing surveys.

The Consumer Finance Survey of 1953 disclosed an average membership of 5.33 persons per 'household', a term which might be equated with a housing unit or house. On this basis there were 1,578,000 houses in the country in 1953 (population 8,411,000). It is roughly estimated that since then 23,000 houses have been built annually. On this basis and putting the annual loss by depreciation at the very conservative figure of half per cent of the houses in existence in 1953, the number of houses in the country in 1957 was 1,638,000. Taking 5.33 persons per house as a measure of housing needs the country needed altogether 1,810,000 houses in 1957. It had only 1,638,000. Thus there appears to have been a backlog of 172,000 houses. This method of calculation is admittedly rather arbitrary and at once assumes away the existence of any backlog in 1953. On the other hand there is evidence of a trend toward increases in family size associated with population growth.

A further point is that in estimating housing needs it is important to draw a distinction between rural and urban areas. Housing shortages in urban areas are more real and cause more distress and discontent than in rural areas ; urban housing also generally costs more than rural housing. According to the data in the Report of the Housing Sub-Committee (1953) the average number of persons per house in urban areas was 7.06 in 1952. For 1957 the average number is estimated at 7.5. On this basis the number of urban houses in 1957 was 207,000 (urban population 1,566,000). Taking as a standard 5.33 persons per house the backlog in urban houses in 1957 was 84,000. From this it would follow that the backlog in rural houses was 88,000 (172,000—84,000).

Looking at the next 11 years 1958-1968 (which includes the plan period) and using the same standards, the total housing need would be as follows:

TABLE XIII

Housing Needs 1958–1968

	Urban	*Rural*	*Total*
Backlog in 1957	84,000	88,000	172,000
Need for new houses 1958–1968	192,000	501,000	693,000
Replacements 1958-1968	11,000	76,000	87,000
	287,000	665,000	952,000

It is clear that with the limitation in resources and the need for development of directly productive sectors, a housing need of this dimension can only be met if very modest or even austerity standards are adopted in design and methods of construction so as to reduce costs to the minimum. All things considered, it would not seem unrealistic to assume that urban houses could be constructed at an average cost of Rs. 7,000 a house and rural houses at an average cost of Rs. 1,300. The Plan provides for the complete satisfaction of the country's housing requirements (full housing) on this basis. The total cost of the programmes would be Rs. 2,875 million (Rs. 2,010 for urban and Rs. 865 for rural). Of this it is assumed that Rs. 150 million was spent in 1958. The balance of Rs. 2,725 million thus would be the aggregate investment needed for the plan years. These figures, as elsewhere, exclude the cost of land.

It is also assumed that at least half of the rural programme could be non-monetized, that is to say, carried out with rural self-help through co-operatives or community organizations without any paid labour. A great deal of emphasis has been laid on such non-monetary capital formation not only in housing but also in other fields like construction of schools, dispensaries, wells, roads, bridges, canals, &c.

It is contemplated that broadly one-third of this investment to be undertaken by the public sector and two thirds by the private sector. This would mean a substantial expansion of the role of the public sector in this field. Government's housing investment has been increasing in recept years, particularly after the creation of the National Housing Department which reflected a new awareness of its responsibilities in this field. However, in 1957 its share was still less than one-fourth of the estimated national investment[1]. A further expansion is now necessary partly because of the size of the new national target (a programme of such dimensions could hardly be realised without the State spearheading and sponsoring a large part) and partly because housing for low-income groups must necessarily be largely the Government's responsibility, since private enterprise would not find it profitable to enter this field. On this basis, taking the whole plan period, an investment of Rs. 908 million is assigned to be public sector and Rs. 1,817 million to the private sector (of which a sizeable portion would be non-monetized).

In absolute terms the programme thus visualises a considerable increase in investment not only for the public sector but also for the private sector. It is believed however, that given the appropriate facilities and incentives, the private sector would be equal to the task. This may call for a reconsideration of the existing facilities. For instance, it is not clear if builders of new houses are exempt from income tax for eight years, the concession that was supposed to be granted to all builders by the National Housing Act of 1954. The position in this respect should be clarified. The existing position regarding rates and rent restrictions may also have to be reconsidered. At the same time the local production of building materials (cement, tiles, bricks, &c.) and training facilities for local skills (masons, carpenters, &c.) must also be expanded so that no bottlenecks impede the realisation of the programme.

The Government carries out housing investment through several Ministries. It builds a certain number of houses in the rural sector through the Land Commissioner's Department and the Land Development Department as part of their development and colonisation schemes. A certain number is constructed by the Department of Fisheries for fishermen. On a different plan, the Ministry of Local Government and Culture Affairs gives subsidies or outright grants to local authorities for demolishing slums and constructing houses or flats in their place. In addition to all this, a certain number of employee quarters are constructed by various Ministries as part of their development projects. But the chief agency of the Government for housing in general (and also for co-ordinating the housing activities of other Departments) is the Department of National Housing. It constructs (1) houses for people in the lower and middle income brackets all over the Island which are transferred to private owners on the rent-purchase method, and (2) housing units in urban areas which are only given for rent (not sold). Apart from construction, it also (1) provides long-term loans to house builders covering the full cost of building and up to 90% of the value of land and (2) acquires land for prospective house builders. It has also other general powers and functions designed to promote housing development in the country.

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[1] National investment in housing 1957 is estimated at Rs. 139 million. Total Government investment by all Ministries and from all sources of finance was Rs. 31·7 million in the fiscal year 1956/57 (which largely corresponded with the calendar year 1957)—Government investment figures from the Central Bank *Annual Report 1958.*

The Department spent in construction and loans Rs. 24.6 million in 1956-57 and Rs. 20.3 in 1957-58[1]. It has now proposed that the Government allow it to spend Rs. 40 million a year during the next ten years, the funds to be raised either by an issue of its own debentures (the method now used) or the Government voting Rs. 40 million annually to it. By a judicious distribution of this capital expenditure between construction of houses for different income groups (the low income groups being necessarily subsidized) and giving out housing loans (some of which could bear high rates of interest), the Department hopes to be completely self-financing after ten years.

From the planning point of view, of course, what is important is that the Government implement its share of the investment, not what particular departments carry out the work or how they obtain funds.

The following is the phasing for the aggregate investment which would be consistent with resource availabilities.

TABLE XIV

Phasing of Investment in Housing 1959–1968

(Rs. Million)

1959	150	1964	273
1960	169	1965	308
1961	190	1966	347
1962	214	1967	391
1963	242	1968	441

TOTAL Rs. 2,725 million.

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[1] Data supplied by the National Housing Department.

THE RELIEF SERVICES

At present the only important capital project which the Government has in mind under this head is the establishment of three Sheltered Workshops for the Deaf and the Blind in Kandy at an approximate cost of Rs. 850,000. Money has already been voted for another project, namely, a House of Detention and a Home for Vagrants at Gangodawila. Considering that the country is already well provided with relief institutions of various types and considering also that with development unemployment will shrink and incomes rise, thereby reducing generally the need for relief services, it may not be unsafe to hold that the need for new investment in this field in the next ten years will not be large or pressing. Perhaps an annual investment of the order or one million rupees would be sufficient. This has been incorporated in the general allocations for Public Administration.

The great bulk of the expenditure on relief services is however of a current, not capital nature. If expenditure on this head is identified with the expenditure of the Department of Social Services and the consumer food subsidies (without deducting from them the profits made on sugar sales), the pattern of capital and current expenditure comes out as follows for the last few years.

TABLE XV

Expenditure on Relief Services 1954/55 to 1957/58

(*Rs. million.*)

	1954/55		*1955/59*		*1956/57*		*1957/58*	
	Current	*Capital*	*Current*	*Capital*	*Current*	*Capital*	*Current*	*Capital*
Relief Services :								
(*a*) Dept. of Social Services	14·3	0·1	24·3	0·3	33·9	0·4	24.2	0·3
(*b*) Consumer food subsidies*	5·1†	—	46·3	—	59·9	—	69·5	—
	9·2	0·1	70·6	0·3	93·8	0·4	93·7	0·3

Note.—Capital expenditure equated with Loan Fund Expenditure.

* Refers only to the consumer food subsidy on rice.

† In this year there was a profit not a loss.

Actually the consumer food subsidies not only dominate the relief services but form a very large part of the total current expenditure on all social services. The subsidies have added to consumption, indeed they are given precisely for that purpose. It follows that to the extent they are cut down, to that extent the Government's aggregate consumption expenditure would be likely to fall, thus releasing more resources for development. In this context possibilities must always be explored for a reduction of the subsidy expenditure ; by methods such as reducing the size of the ration, increasing its price or excluding the more well-to-do from it. The chances of any early or large reduction in the supply prices of the articles subsidized would seem to be rather remote. However, it is necessary to warn that at present rates and with the growth of population the total subsidy expenditure would swell to enormous proportions in the future. As shown in Chapter 3 of this Report by 1968 the subsidy on rice, both producer and consumer would, at current rates, then amount to at least approximately Rs. 260 million the greater part of which, however, would be the producer subsidy. The consequences of this to the pattern of financing and the implementation of the plan would indeed be serious. For although there is some case in the context of the pressures generated by a vigorous development effort to subsidize the prices of one or two basic necessities the extent of this subsidy must not be allowed to get out of hand.

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OTHER PUBLICATIONS OF THE PLANNING SECRETARIAT

1. Estimated capital outlays of the Ceylon Government 1954–55 and 1955–56 (out of print)
2. Six-Year Investment Programme 1954–55 to 1959–60 (do.)
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5. Population Projections for Ceylon 1956 to 1981 by S. Selvaratnam
6. Manpower Resources of Ceylon 1956 to 1981 by R. M. Sundram, V. R. Rao and S. Selvaratnam
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PREFACE

THIS Report aims at providing for the first time a comprehensive Plan of development for the Ceylon economy covering both the public and the private sectors. It not only presents programmes of development for the several important spheres of the economy, but also brings them together to form a balanced and co-ordinated whole. The Report thus represents a further maturing of the planning process in this country particularly since the publication of *The Six-Year Programme of Investment* and *The First Interim Report* of the Planning Council.

The Report itself is divided into two parts. Part I is essentially concerned with the economy as a whole. The first chapter discusses the long-term perspectives against which more detailed planning has to take place. It does not deal with the Ten-Year Plan itself but describes, in the particular context of Ceylon, the long-term strategy that should guide policies and plans for future development. Chapter 2, presents a comprehensive plan of development for the next 10 years. It indicates the several inter-related magnitudes of such a Plan. These magnitudes indicate the scale of total investment and its distribution between the several fields of the economy and between the public and private sectors. The targets of output that should be realised for the various commodities are also indicated. In addition, an assessment is made of the effects of the Plan on such factors as the balance of payments, employment, national income standards of living, and so on. The content of individual programmes which together make up the Plan is also summarised in brief. Chapter 3 discusses problems of relevance to the financing of the Plan. A comment on certain factors of an institutional character is made in Chapter 4.

In Part II, the programmes for the several sectors of the economy are described and analysed in some detail. Individual chapters set out the programmes for the export crops, domestic agriculture, fisheries, large and small-scale industry, power, transport, and social services.

The Plan is in several respects ambitious. Its implications are far-reaching and it would when implemented profoundly affect the life of the entire nation. Nevertheless, the implementation of the Plan is well within the capabilities of the country. Ceylon is not a country which is at the very beginning of a process of development. On the contrary, she has now reached a stage from which a big step forward is possible. What is required most of all is confidence that the task can be accomplished. Given this much else will follow.

The Plan provides a focal point around which the efforts of the nation should henceforth be centered. It is therefore of the greatest importance that the Plan becomes the subject of nation-wide discussion. Although the Plan is closely integrated in many respects it is not inflexible. Informed criticism and comment, and suggestions concerning both the Plan itself and its implementation would be of particular value. It is recognised that in its present form the Report may not meet the needs of a very wide reading public. Unavoidably, the requirements of technical analysis played a part in determining the manner of presentation. It is therefore important that this Report be supplemented with publications which are in the nature of popular summaries in all three languages.

The work of planning does not end with the preparation of the Ten-Year Plan. Much remains to be done. In particular, as mentioned in the Report itself, it is important to follow up the Ten-Year Plan with a short-term operational programme covering say the next 2 or 3 years. This should highlight the immediate organisational and executive tasks that must be put under way if the goals of the Ten-Year Plan are to be realised. However, the preparation of the Plan represents the completion of a particular stage. From this point on the emphasis must necessarily shift in the direction of action and implementation.

In presenting this Report, the Council wishes to acknowledge the valuable assistance it has received from several quarters—from the eminent economists who visited Ceylon on the invitation of the Council; from the numerous persons, both official and unofficial, who served on the Council's committees and working groups; and from the various Ministries and Departments of Government. The Papers submitted by the visiting economists and the reports of the working groups and committees of the

Council are being made available in separate publications. Particular mention must be made of our indebtedness to the Planning Secretariat for its arduous and valuable work in the preparation of this Report.

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PART ONE

The Overall Picture

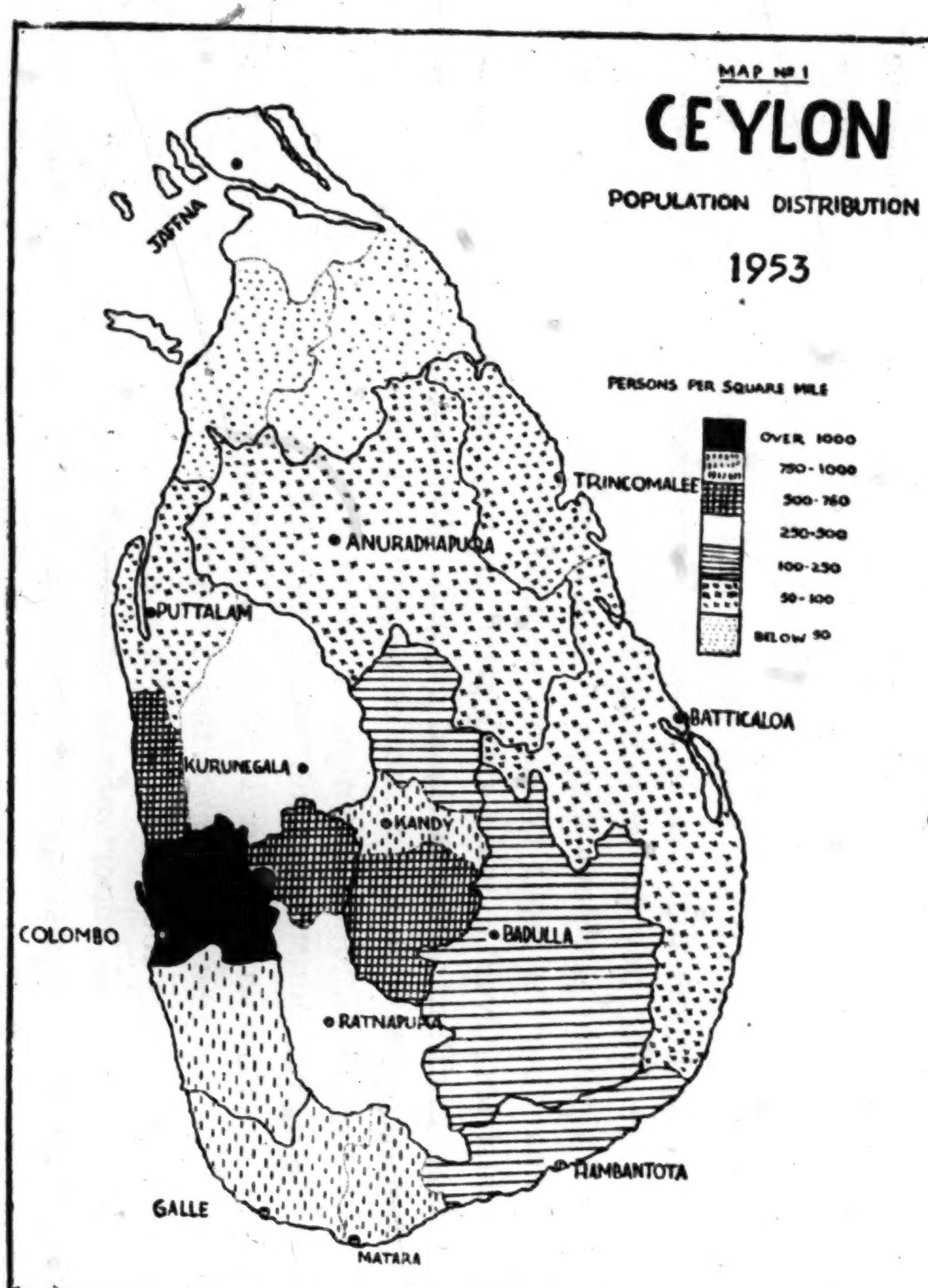
3—J. N. R 2359 (6/59.)

CHAPTER I

THE LONG-TERM STRATEGY OF DEVELOPMENT FOR CEYLON

THE present chapter is concerned essentially with long-term perspectives extending well beyond the period of a specific plan. Part II of this report presents a Plan for the next 10 years. The aim here is to formulate the broad principles which should govern a planned programme of economic development for Ceylon. These principles have to be fashioned in the context of basic economic realities and must take account of such factors as the size and resources of the country, its present economy and its future prospects. The question of what fields to emphasise in development and the choice of priorities between them cannot be satisfactorily resolved except in terms of a broad pattern that is mapped out in advance. Such a pattern will help provide a sense of direction to the nation's efforts in development and planning. In some instances the principles outlined here which are of relevance to the long-term may have to be modified to meet the needs of the shorter period. The nature of these modifications are discussed in the sections dealing with the Plan itself.

The pattern of future development is not merely a matter of the institutional forms that are to emerge. These issues are undoubtedly of importance. But they do not detract from the fact that from an economic point of view the problem of growth is in large measure one of establishing and expanding the right types of productive activity and the right kind of industries. Over a wide field what is required for development is common to different institutional systems. For example, the mere fact of a growing population and a limited agricultural potential will alone point to the need for industrialisation or for other non-agricultural activities. The need for industrialisation would in turn underline the urgency of power development. Again if there is an adequate potential for the cultivation of new land and this requires water, the construction of irrigation systems must form part of a development plan. Issues of this nature are of vital importance to planning but they do not depend very closely on institutional systems and forms of ownership. The strategy of development outlined in the discussion that follows largely concerns itself with such issues. It would generally hold true irrespective of the institutional forms that are to be established.



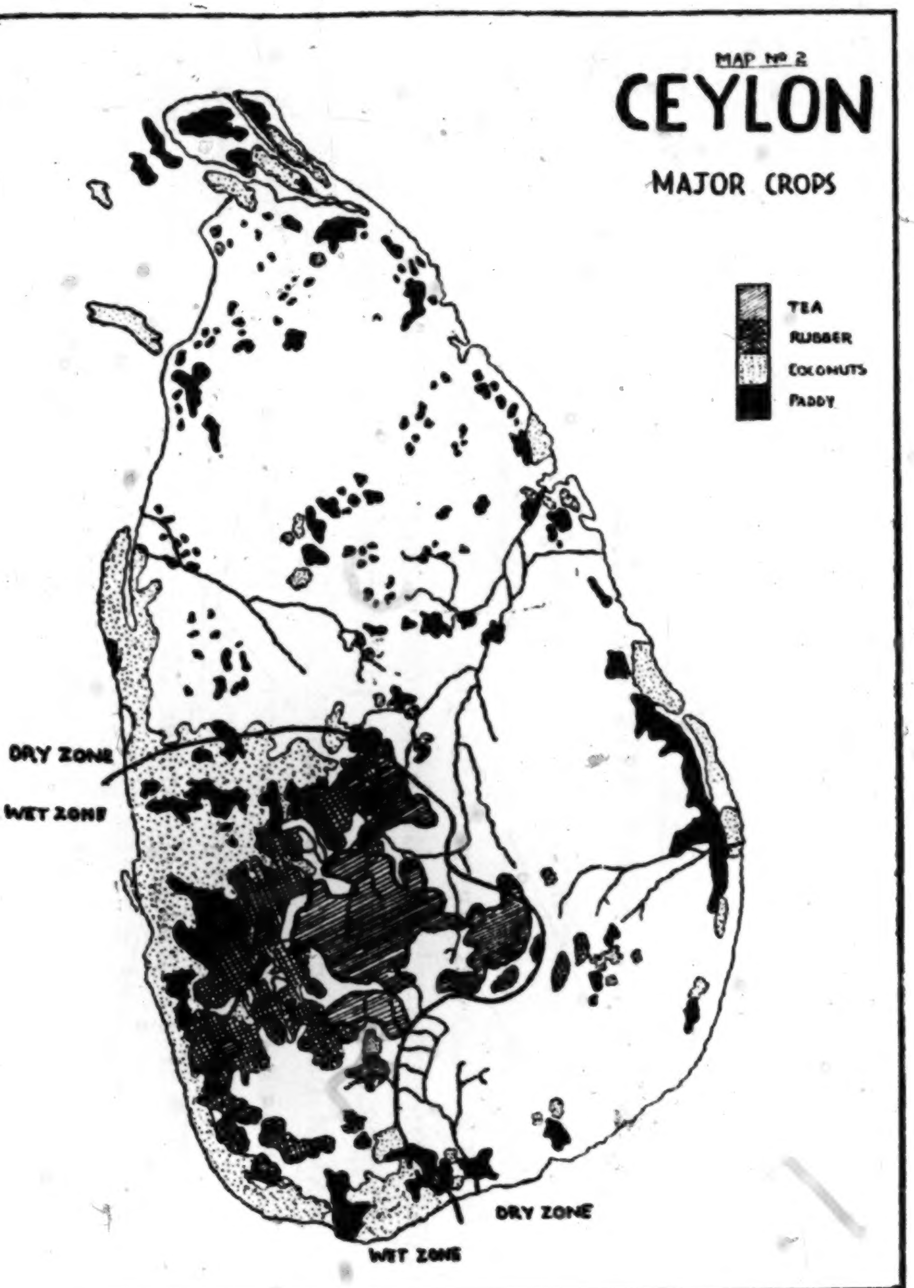
MAP No 1

CEYLON

POPULATION DISTRIBUTION

1953

PERSONS PER SQUARE MILE
OVER 1000
750-1000
500-750
250-500
100-250
50-100
BELOW 50
JAFFNA
TRINCOMALEE
ANURADHAPURA
PUTTALAM
BATTICALOA
KURUNEGALA
KANDY
COLOMBO
BADULLA
RATNAPURA
HAMBANTOTA
GALLE
MATARA



MAP No 2

CEYLON

MAJOR CROPS

TEA
RUBBER
COCONUTS
PADDY
DRY ZONE
WET ZONE
DRY ZONE
WET ZONE

I. Ceylon's Economic Position

Relative to many other countries in Asia Ceylon has so far enjoyed a favourable economic position. Comparative figures of average incomes per person as shown below provide a broad though imperfect measure of this. Although far behind western standards Ceylon's per capita income is not much below some of the countries of Europe and South America.

TABLE I

Annual Per Capita Income

(1953-54 *Average*)

(Rupees)

Country	*Income*	*Country*	*Income*
U. S. A.	8,872	Phillipines†	784
U. K.	3,583	Argentine	571
France	3,561	*Ceylon* (1957)	492
West Germany	2,532	Egypt	480
Malaya (Fed. of)* † (1952 and 1953 only)	1,562	Peru	460
		Brazil	456
Chile	1,170	Indonesia†	448
Japan†	†867	Pakistan	341
Portugal	828	India	268

Notes.—*The gross national product at factor cost was used. For all other countries net national product at factor cost or national income was used.

Source : For countries marked† *Economic Survey of Asia and Far East 1957 :* All other data from *Year Book of National Account Statistics 1957* and *Demographic Year Book 1956.* For Ceylon Planning Secretariat estimates are used.

Other indices of prosperity would also reflect Ceylon's relative advantages vis-a-vis many of the countries of Asia. In educational facilities, literacy, health services, and so on, Ceylon is known to enjoy a favoured position. Often, the development efforts of other countries less well off than Ceylon aim at reaching future standards of prosperity comparable to what already prevail here.[1]

As in many other countries of Asia most of Ceylon's working population is engaged in peasant farming, producing rice and certain other peasant crops. But it is not this type of activity which explains Ceylon's lead. The productivity of peasant agriculture is not markedly different in Ceylon from other Asian countries. Nor, of course, is industrialisation an explanatory factor. The relative size of the industrial sector in Ceylon has hitherto been small. The chief reason lies, on the contrary, in the prevalence of plantation agriculture producing tea, rubber and coconuts for export to world markets. The plantation sector is one of markedly high productivity. It is also of significant size in relation to the economy as a whole.

Other countries, India for example, are also large producers of plantation crops. But whilst the output of these crops accounts for between 35 and 40 per cent of Ceylon's national income, their corresponding contribution in India is very much smaller. It is only in a few countries of the region, Malaya being a prominent example, that plantation agriculture plays a comparable role as in Ceylon ; and it is not without significance that in Malaya, where plantation output provides a substantial part of national income, income per head is even higher than in Ceylon. Indeed if both the output of plantation crops and the population dependent on it are excluded, Ceylon's per capita income would fall. In fact the importance of the plantation sector is much greater than suggested by such a calculation since no account would be taken of the innumerable activities which have grown out of and are dependent on the plantations.

---

[1] For example, the following projections of per capita income over a 25-year period, covering five five-year plans, have been for India :—

Growth in Income and Investment (1951–56 to 1971–76)

(at 1952–1953 prices)

	First Plan	*Second Plan*	*Third Plan*	*Fourth Plan*	*Fifth Plan*
1. National Income at the end of the period (Rs. crores)	10,800	13,480	17,260	21,680	27,270
2. Total net Investment (Rs. crores)	3,100	6,200	9,900	14,800	20,700
3. Investment as a % of national income at the end of the period	7·3	10·7	13·7	16·0	17·0
4. Per capita income at the end of the period	281	331	396	466	546

Source : Summary of the Second Five-Year Plan, Planning Commission Page 5

II. Population Change—The Ceylon Experience

The comparative advantages which Ceylon has so far enjoyed are real as these illustrations indicate. But today there is at least one factor which is of particular significance to their continuance. This factor is the growth of population.

The course of Ceylon's population since 1871, the date of the first complete and relatively reliable census, is shown below :

TABLE II

Population Growth 1871–1956 ('000)

Year	*Population*	*Year*	*Population*
1871	2,820	1921	5,304
1881	3,044	1931	6,053
1891	3,330	1946	7,122
1901	4,031	1953	8,411
1911	4,702	1956	9,375

Note.—The figures up to 1946 are as corrected for in a recent study—*The Demography of Ceylon* N. K. Sarkar, Ceylon Government Press, page 22.

The figures from 1953 onwards are from *Population Projections for Ceylon 1956–1981* S. Selvaratnam, Published by the Planning Secretariat, Colombo. Page 21

Over the last 50 years Ceylon's population has more than doubled. It is continuing to increase at a rapid rate, and is today a dominant factor in the economic situation. What implications does this have for Ceylon's economic future ? It must be recognised that an expanding population is not an experience which is new to countries in a process of development. On the contrary it has been a phenomenon common to virtually all countries during the phase of industrialisation and economic transformation. But there are significant differences between what Ceylon is experiencing today and what took place elsewhere. It is important that these differences be understood.

In Western countries, before the period of economic transformation, populations were relatively stable.[1] Both birth and death rates remained high although the latter, due largely to recurrent epidemics and famines, were more susceptible to fluctuations than the former. In those countries too economic development brought about a fall in death rates. This was

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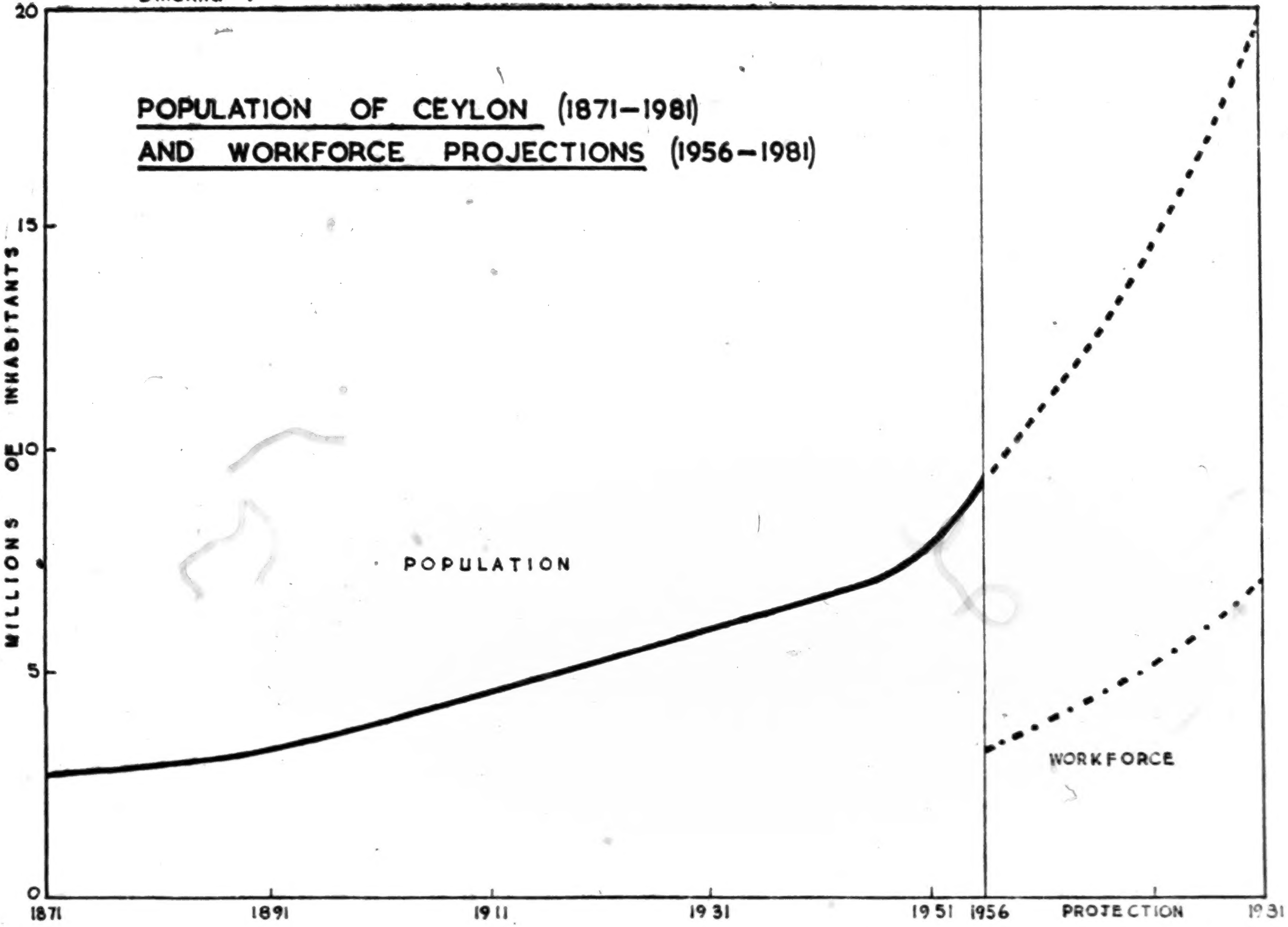
[1] Coale and Hoover : *Population Growth and Economic Development in Low Income Countries.*

DIAGRAM 1

POPULATION OF CEYLON (1871–1981) AND WORKFORCE PROJECTIONS (1956–1981)



due in the first instance to the improvements in communications, transport and productivity which led to greater and more regular food supplies and secondly to the advances in medical knowledge and its application. Population analysts ascribe the reduction in European mortality rates during the eighteenth and early nineteenth centuries primarily to the first cause and the decline during the later nineteenth and twentieth centuries to the second. The period of economic development in those countries also witnessed a fall in birth rates. The precise reasons for this are more difficult to analyse but they are associated with the numerous social consequences of economic change. These included urbanisation, the evolution of a national labour market, greater labour mobility, the employment of women, and the emergence generally of modern methods of productive organisation all of which tended towards reducing the premium which agrarian societies placed on large families.

The fall in birth rates, however, lagged behind the decline in death rates. The delayed response of birth rates—relative to death rates—has been explained in terms of the greater dependence of the former on changes in well established institutions and traditions and the comparative ease of mobilizing and directing social efforts towards reducing sickness and mortality. The net effect of the lagged decline in birth rates was a substantial expansion in total population itself. Thus "in a period between 1750 and 1950 the 'area of European settlement' increased in population sixfold. The population more than doubled in the century from 1750 to 1850, and nearly tripled in the interval 1850 to 1950."[1]

The growth of population at high rates of increase is not, however, sustained indefinitely. After mortality rates reach low levels further reductions become more difficult and these rates are caught up by the declining birth rates. A position of relative stability or, more commonly, of only gradual growth is restored once more. In this situation both birth and death rates remain low, although now it is the birth rate which, being more subject to the influence of voluntary decision, tends to fluctuate more strongly. There is some evidence[2] to suggest yet another phase—a return to high birth rates in highly developed societies—but the evidence has covered too short a period to justify firm conclusions.

Ceylon's present situation with its rapidly growing population may suggest at parallel with the Western experience. It may seem to constitute a familiar phase of a process of development with an ultimate prospect of stability at prosperous levels of living. But there are significant differences which indicate that this is not so. These differences show Ceylon's position in a different light and it is important that they be recognised.

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[1] Ibid. p. 12.

[2] From the U.S.A., Canada, Australia and New Zealand.

The essential difference between Ceylon and the West may be briefly explained. In the Western experience the process of declining mortality was a relatively protracted one. It was dependent, particularly in the early stages, not so much on radical advances in medical science but on the more generalised improvements flowing out of economic change. This very process of change influenced the birth rate as well and although its response was delayed the relative course of birth and death rates were such as to keep the rate of population growth within manageable limits. Population growth accompanied economic change and expansion and thus proved consistent with rising average standards in individual incomes.

In Ceylon the fall in the death rate has been much more rapid. The result has been that this country has accomplished within a few years what took the West several decades to attain. To some extent the causal factors behind the improvements in mortality in Ceylon have been of a similar kind to those at work in the West. The process of declining mortality here is not, as is commonly thought, an exclusively postwar phenomenon. On the contrary, there has been a declining trend in death rate even over the period 1910-1947, i.e., before the advent of the developments associated with DDT and antibiotics. As in the West, the improvements in mortality over that period must be ascribed to the impact of general economic progress and to the concomitant improvements in health services. But even here the pace of decline was more rapid than in the West, and less dependent on the kind of structural changes in the economy experienced by the latter.

What is significantly different however is Ceylon's experience after 1947. Since that date, DDT and other developments in the field of medicine have enhanced sharply the declining trend in death rates. This has resulted in a 'performance' in this field without parallel in the West. It has enabled Ceylon to attain within a brief period a level of death rates comparable to Western countries. As one writer put it, "Ceylon was making a very slow progress in combating deaths till 1920-22, and did not reach the English standard of 1848-50 until then. Progress since then has been more rapid, and the English standard 50 years later in 1896-1900 was reached in 25 years, i.e., 1945-57. Since 1946 the progress has been phenomenal .... and twenty-five years of progress by the English standard has been achieved in about 3 years".

The sharp fall in death rates alone would have resulted in a growth of population in Ceylon much faster than in the West even if birth rates had followed the Western pattern. But it is not merely the rate of fall in death rates that is significant. What is also important is that the reduction in the death rate, particularly in recent years, was not required by radical alterations in the agrarian structure. Modern medical innovations like DDT and antibiotics and other low cost public health services can be carried into the rural areas relatively simply. They could effectively bring about a striking reduction in mortality within the prevailing pattern of rural society. In the West the fall in death rates flowed out of and accompanied the transformation of agrarian society. In Ceylon and in other underdeveloped countries of the present day such a transformation is no longer a necessary condition for a reduction in mortality.

The implications of this are apparent. If a fall in death rates is less dependent on social and economic changes it could take place in conditions where the deep rooted customs and traditions which influenced the birth rates are left relatively undisturbed. In the West, the very forces which brought about a fall in the death rate also evoked a response in birth rates. This response, though delayed, set limits on the rate of population growth. In Ceylon not only has the fall in death rates been faster but it has also taken place without any comparable decline in birth rates. Thus in 1957 when the death rate had reached a "Western" level of 10 per thousand the birth rate was 36 per thousand. Fifty years previously in 1907, the birth rate was not very different 37.6 per thousand whilst the death rate was, in contrast 30.7 per thousand. It is true that there have been changes in the birth rate over this period. But the trend has not been continuously downward. Thus the birth rates showed a fall in the period from the beginning of the present century to the first world war, relative stability during the twenties and thirties, and a marked rise once again during the forties[1]. But even the declining trend, during the period it occurred, cannot be ascribed entirely to factors associated with economic change of progess. Whilst a fall in the birth rate is affected by such factors as urbanisation and its effects on the age of marriage, it is also influenced by conditions of economic adversity and distress. Sickness can depress fertility whilst economic hardships may also delay the age of marriage. When these factors are removed or reduced, as was probably the case since the forties, the birth rate may rise once more.

The results of all this in Ceylon have been striking. As mentioned earlier, even if the course of birth rates here was comparable to that of the West during the period of development, population growth would have been considerably faster. But the falling trend in the birth rate was reversed during the forties and the rate itself restored to the level of the early part of the century. The outcome has been a rate of population increase quite unparalleled by the general western experience. The annual rate of population increase in Ceylon in recent years has been about 2.6 per cent. Western countries, as shown in the table below, generally did not have to cope with a rate as high as this during their period of economic development. Moreover the West experienced its period of population expansion in the course of a process of economic transformation which itself exerted a determining influence on the course of birth and death rates. Ceylon is faced with an immensely greater rate of population growth in an economic background which does not manifest these changes to anything like the same degree.

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[1] N. K. Sarkar op. cit. p. 97.

TABLE III

Population Growth in Western Countries (1820–1940)

Average annual percentage increase during previous twenty years

1820	1840	1860	1880	1900	1920	1940
1·15	·86	·98	·90	·99	·90	·70

Note.—Countries included : Denmark, Finland, France, Great Britain, Netherlands, Norway, Sweden, Switzerland.

Source : Quoted in *Economic Development* by Meir and Baldwin.

The pace of population growth in Ceylon is high not only in comparison with historical rates that prevailed elsewhere but also with rates in other regions today including Asian and other underdeveloped countries. Ceylon's rate is exceeding by far that of many other countries in the region as is shown in the footnote below[1]. Whilst the importance of the Indian population problem is generally recognised and there is an awareness of the effort of the Government to deal with it, it is not often realised that the rate of population growth in India is half that of Ceylon's.[2]

What conclusions can be drawn about Ceylon's population problem ? The first point that arises concerns the possibility of a slowing down in the future rate of increase. Processes such as urbanisation and industrial development, the spread of education and literacy, the changing role of women in society, and high income levels in general, may all be expected to contribute towards a lowering of birth rates. Indeed there is some suggestion of such a lowering in recent years. But the crucial question is—*how fast can these results be realised ?* In the West the response of birth rates to economic changes and to improvements in living standards was a slow and gradual one. So far Ceylon has not even realised the Western experience

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[1] Percentage growth of Population (1953–57) :

Taiwan	3·6	Pakistan	1·4
Ceylon	2·5	India	1·3
Federation of Malaya	2·4	Japan	1·2
Philippines	1·9	Burma	1·0
U. S. A.	1·8	Sweden	0·5
Indonesia	1·7	U. K.	0·4

SOURCE : *Statistical Yearbook* (*UN*) 1958.

[2] See table in note 1 above.

in respect of the birth rate. Even if a repetition of the Western pattern should occur in the future the resulting decline in birth rates would not, against the existing death rate, produce anything like the corresponding Western pattern in respect of population as a whole. For this a fall in birth rate faster than in the West is needed. The crucial point is that a rapidly growing population may so offset the effect of economic development on living standards that the necessary conditions for a fall in the birth rate may themselves be destroyed. For, when increases in national income are offset by population growth, standards of living will remain depressed.

III. Future Population Prospects

Attempts have been made to measure the possible increase in future population. Broad population projections had previously been prepared by the Registrar-General's Department, the United Nations Population Division and by Dr. N. K. Sarkar. In view of the need for more detailed projections for several purposes connected with planning the Planning Secretariat recently requested the Demographic Research and Training Centre in Bombay to prepare further and more elaborate estimates. These studies have recently been completed and have been published separately by the Planning Secretariat.[1] The table below summaries the general aggregates of population as have emerged from them.

TABLE IV

Projected Population of Ceylon (1956–81)

('000)

	1956	1961	1966	1971	1976	1981
Projection [2]						
(i) High	9,375	10,873	12,647	14,809	17,471	20,701
(ii) Medium	9,375	10,873	12,694	14,573	17,877	19,508
(iii) Low	9,375	10.873	12,541	14,342	16,312	18,424

Notes.—The estimates are based on the following assumptions :—

(*a*) Mortality : An orderly decline along an exponential curve of the 1956 specific death rates till the end of the projection period.

(*b*) Fertility (i) Constant from 1956 to 1981.
(ii) Constant from 1956 to 1961 and thereafter a 5% decline every quinquennium.
(iii) Constant from 1956 to 1961 and thereafter a 10% decline every quinquennium.

(*c*) Migration : Nil.

The increase in population depicted above is higher than envisaged in any previous projections. Thus in Dr. Sarkar's projections the annual

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[1] *Population Projections for Ceylon, 1956–1981*, Planning Secretariat 1959

[2] The growth rates implicit in these projections are as follows :—

Projected Growth Rates

Period	1956–61	1961–66	1966–71	1971–76	1976–81
(i) High	3·01	3·07	3·21	3·37	3·45
(ii) Medium	3·01	2·98	2·96	2·98	2·94
(iii) Low	3·01	2·90	2·72	2·61	2·47

growth rate declines from 1.84 per cent. in 1956-61 to 1.70 per cent. in 1971-76. In the Registrar-General's projections growth rates rise from 2.86 per cent. in 1955-61 to 3.04 per cent. in 1965-70, whilst the U. N. Studies depict an increase from 2.56 per cent. to only 2.57 per cent. over the same period. These variations are primarily due to differences in the assumptions used particularly in regard to mortality.

Despite the differences however, all estimates point to a substantial increase in total population. What does this imply for Ceylon's economic future? The complex relationship which population growth bears to economic development cannot be discussed at length here. But there are at least a few important points which deserve emphasis. It is possible to conceive of circumstances where an increase in population is itself a condition for further development. Countries which are unable to exploit their resources to the full on account of a shortage of labour will fit this case. But this is clearly not the situation in Ceylon and in many other countries of the region today. In these areas low levels [illegible] development exist alongside chronic unemployment and the pressure of population on land and other resources is already excessive. In this situation a further expansion in population can hinder rather than help development.

There are at least two important ways in which population growth is burdensome. First, an increasing population tends to depress the rate of investment. A high rate of investment is a key factor in the rate of economic expansion. But, foreign borrowing apart, the rate of investment in effect represents the proportion of total income which is released from current consumption. Now population growth by itself tends to increase current consumption since an increasing volume of output has to be devoted each year to feeding and clothing the additional numbers. This results in a smaller volume of investment which means in turn a smaller increase in national income. Since population is growing, incomes per person and standards of living are themselves depressed below what they would otherwise be and this has further unfavourable effects on the rate of investment.

Secondly a rise in population adversely affects the distribution of investments. A sizeable proportion of the resources for investment have to be devoted to meeting the social needs of the rising population in the way of school buildings, houses, sanitation systems, and so on. Investments in these fields compete with investments in the directly productive spheres and result in an allocation of resources unsuited to the needs of maximum growth. Such a maldistribution of resources would itself have cumulative depressing effects on the level of future investment. Ceylon is already facing problems of this sort. Not only does the consumption needs of a growing population tend to depress the rate of investment but the social services, education, health and housing themselves make increasing claims on investment resources.

It is clear that unless there is some prospect of a slowing down in the rate of population growth and of relative stability in at least the long run it is difficult to envisage substantial benefits from planning and development. It is not so much the size of the population in an absolute sense but rather the rate of increase that tends to frustrate attempts to step up the rate of investment and to increase incomes per head. Apart from the difficult process of cutting present levels of consumption, the source for increasing the volume of investment is the "ploughing back" of portions of future increases in incomes. This task is handicapped if these increases have instead to be devoted each year to sustaining a larger population. Obviously, the impact on future investment and per capita income of a national income which is rising annually by say 5 to 6 per cent. would substantially be different if population growth was 1 per cent. instead of 3 per cent. Other developing countries experiencing similar, and often a less serious population growth have already recognised this and have included "population policies" as part of their planning goals. These policies are not alternatives to vigorous attempts at development. On the contrary their purpose is merely to ensure that the fruits of these attempts are realised.

The argument here concerns not the under discussed relationship between population growth and food supplies, but the difficulty of capital accumulation to keep up with and exceed the increase of population. To achieve a rise in the standard of living it is necessary to increase the *per capita* capital equipment of the economy. In other words capital must grow faster than population. Thus the greater the rate of increase of population, the greater the need to raise the rate of capital accumulation and the greater the national effort necessary to increase the standard of living of the people. Further as mentioned, a rapid increase in population tends to decrease savings, and generates pressure to utilize the surplus of the national economy for investments in social services and other fields that are not directly productive. These—rather than the specific problems of food—are the real economic difficulties connected with a rapid increase in population.

What can be done in Ceylon ? Obviously the Malthusian path of a return to high death rates must be ruled out. The alternative course concerns the birth rate. Can the course of the birth rate be influenced by a deliberate effort on the part of social policy which excludes at the same time all forms of compulsion ? Apart from a postponement of the age of marriage, a limitation on the size of the family is an important influence on the birth rate. Although there are other factors outside the field of conscious decision which affect fertility amongst married couples, it is in fact the conscious decision to limit births that has elsewhere played a crucial part in the reduction in family size. The question that arises is whether such decisions can be actively influenced by policy. The answer would appear to be in the affirmative.

In the conditions of today the advantages associated with the large family are fast diminishing. Even in the rural areas conditions have altered from this point of view. In the era of high death rates a large number of children were an insurance against low survival rates. Today with the fall in death rates rural families are becoming even larger than customary and it would be surprising if parents in these areas remain unmindful of the additional burdens involved. In addition, population increases promote fragmentation and a reduction in the size of individual holdings. Quite apart from the possibilities of mechanisation, this factor alone would tend to reduce the advantages hitherto provided by the large agricultural family. The spread of education and literacy would also exert an influence in a similar direction since these promote a greater awareness of higher standards. The education of females may have particularly far reaching effects through its influence on feminine attitudes. It is indeed possible that this may turn out to be the most important single factor behind any future fall in birth rates.

Given conditions such as these, population polices and planning campaigns may produce effective results. Their role would essentially be to strengthen the factors favouring a decline in birth rates in the interests of both the individual family and society as a whole. Such campaigns disseminate information on methods of birth control and help in making birth control devices readily and cheaply available. In western countries the decline in birth rates was brought about by methods of birth control known at the time rather than by the use of modern devices of contraception. The latter constitutes a relatively new factor in the situation which may make possible a more rapid fall in birth rates than in the west. In short, the purpose of a family planning campaign should be to encourage and aid attitudes and outlooks that may otherwise be slow in emerging. The course of the birth rate could in this way be made different to what it may otherwise be.

A beginning has already been made in Ceylon in this direction. The time is opportune for tackling the problems on a far bigger scale. It is outside the scope of this discussion to detail specific measures. It is, however, desirable that the whole question of population policy in all its aspects be made the subject of nationwide discussion perhaps through the medium of a competent Committee of Inquiry. Such a committee should receive evidence from the public, undertake statistical studies, analyse the economic implications of population growth, and present the details of a future programme of action. It would, provide a valuable medium for promoting increased public awareness of this vital problem.

It would be important in this connection to study the experience of at least three countries in the Asian region—India, Japan and China. Each of these countries is known to carry out programmes in this field, and Japan in particular has recently succeeded in bringing about a sharp decline in birth rates. Without doubt Ceylon can benefit greatly from this experience.

In judging the practical importance of action in the field of population policy, some important considerations must be borne in mind. The effects upon employment of a reduction of the rate of population growth will appear only 16-18 years later, i.e., when the new generation enters the labour market. But the effect upon the standard of living of families could be more immediate. Thus, families carrying a smaller economic burden of raising children would be able to have a more comfortable standard of life than otherwise. Further, a reduction in the rate of population growth creates immediately conditions favouring more rapid economic development. Savings would be stimulated and investment resources released which would otherwise be needed for providing the various services—social and private—made necessary by population growth.

It is necessary, however, to emphasise that such action cannot be conceived as a substitute for a plan of economic development. Family planning has been frequently interpreted as offering a substitute for positive planned action aimed at promoting economic development based on industrialisation. Such a misuse of the idea of family planning, however, should not prevent it from being utilised properly, not as a substitute, but as an integral element of a broad policy designed to raise the standard of living of the people by means of the planned development of the national economy.

IV. The Expansion of the Workforce

A rapid growth in population is accompanied by a corresponding increase in the workforce. Hence the problems associated with a rising population extend beyond those relating to income levels and investment magnitudes. They also concern employment. Rates of economic growth which are sufficient to safeguard and even improve average income levels when population is rising may yet be inadequate to ensure full employment within a foreseeable period for the growing workforce.

An impression of the entire employment problem in Ceylon is given by projections of manpower resources. Parallel to the study relating to population projections referred to earlier, an estimate of the future manpower resources of Ceylon has also been made. This too has been published separately by the Planning Secretariat.[1] The results of this estimates covering the twenty-five-year period 1956-1981 are summarised below :

TABLE V

Workforce Projections (1956–1981)

(*Persons* '000)

Year	1956	1961	1966	1971	1976	1981
Males	2,606	2,975	3,432	3,965	4,574	5,260
Females	806	945	1,121	1,321	1,546	1,805
Total	3,412	3,920	4,553	5,286	6,120	7,065

Note.—Estimates are based on the medium projection for total population.

A description of the method of derivation of these estimates and of the assumptions concerning participation rates and other factors are provided in the published study. They are not therefore, expanded upon here.

The size of the future increase in the workforce as shown by these figures is striking. If the country's total population expands in the manner depicted by the medium projection indicated earlier, an additional 3.7 million persons would enter the workforce over the twenty-five years ending 1981. The increase in the male component of the workforce is alone 2.7 million.

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[1] *Manpower Resources of Ceylon 1956–1981*—by R. M. Sundrum with the assistance of V. R. Rao and S. Selvaratnam. A report prepared at the Demographic Training and Research Centre, Bombay, at the request of the Planning Secretariat, pp. 24, 29

These figures serve to indicate the true dimensions of the problem of future development on the context of a rapidly growing population. Briefly they imply that, unless there is some relief through a slowing down in the rate of population growth, avenues of employment must be found fast enough to absorb these numbers over the twenty-five-year period.

The additional numbers who would enter the workforce over the next decade and a half, however, do not depend on the future course of the birth rate. These persons are already part of the existing population below working age. The Plan that is presented in subsequent portions of this report aims at absorbing the manpower resources that would be available over the next 10 years. It is not, therefore, affected too closely, by changes in the future course of the birth rate.

Over the long period, however, the question of the future birth rate is of crucial importance. The sections that immediately follow, discuss the strategy of development for Ceylon not merely in relation of the next 10 years but in terms of a long-term perspective. It assumes that the workforce would continue to grow over a period extending well beyond the next 10 years. In the light of this it seeks to evolve a strategy of development capable of absorbing the growing numbers into productive employment. It must not be thought, however that such a strategy would remain unaffected by the rate at which the workforce is increasing. On the contrary, an excessive rate of increase, sustained over a long period, will hinder the application of an effective development strategy and indeed negative the entire process of rapid economic growth.

V. The Long-Term Capacity of Agriculture as a Source of Productive Employment

The problem of employment is thus one of the key questions of relevance to planning in Ceylon. For this reason it is convenient to present a discussion of development strategy largely in terms of employment although, of course, questions concerning the patterns and directions of development are not determined by considerations of employment alone. The present section and those to follow are concerned with the spheres of future development. They seek to answer the question of the fields of productive activity in which the future workforce could be found productive employment.

Today the major part of the population of Ceylon is engaged in agriculture, producing largely plantation crops and rice. Based on these sectors, there have also arisen a number of ancillary activities and occupations in both the rural areas and the towns. These avenues are Ceylon's traditional sources of employment. What scope is there for their future expansion and what contribution could they make towards absorbing the future workforce ? It is of some importance first to attempt an assessment of this. It is necessary, in other words to estimate the additional employment potential of agriculture in terms both of lands already under cultivation and new areas capable of being cultivated in the future. The discussion that follows relates to the long-term or ultimate potential of agriculture rather than to the possibilities over the next 10 years.

EXISTING LANDS

In the case of land already under cultivation the absorption of additional labour would naturally depend on the scope for increasing productivity further and on the labour requirements of this process. Now there certainly exists a considerable potential for increasing productivity. As is shown in later chapters of this report the output of the main plantation crops is capable of substantial expansion on the present acreage alone. Thus recent estimates indicate that if the areas presently under tea are replanted with high-yielding material and also rehabilitated in other ways, total tea output could ultimately be more than doubled through a raising of the average yield per acre from the present level of 711 lb. to 1,600 lb. Similarly rubber output could be increased by a comparable magnitude by raising average yields from 375 lb. to 1,100 lb. In the case of coconuts the potential increase in output, though less striking on present estimates, is still substantial. Coconut production can expand by 39 per cent. through a raising of average yields from 2,150 nuts per acre to 3,000 nuts. In all these crops yields much higher than the averages mentioned above could be obtained on the better lands.

These increases in productivity may certainly be expected to provide additional employment opportunities. Nevertheless, the increase in employment will not be of the same magnitude as the increase in output. The process of replanting and rehabilitation itself will not make a significant net contribution to employment since it will utilise existing labour released from current operations on the same land. But once the replanted areas are in productive bearing there is likely to be some increase in labour requirements associated with the higher output. It is a hazardous task to attempt quantitative estimates of this, since the future course of technology remains an unknown. But abstracting from this, and on the basis of certain factors utilised in a subsequent chapter, it is possible to make a rough assessment.[1] The present labour requirement per acre on tea is estimated to be 1.1 labour units per acre. On the basis of the increase in yields referred to, this requirement is expected to rise to 1.9 labour units involving a total increase of 392,000 persons over the *whole* of the present area. Similarly labour requirements on rubber rise from .39 labour units per acre to .64 units. The total increase is 117,490 persons. In the case of coconut, labour requirements are particularly difficult to assess but rough estimates suggest an increase from .08 labour units per acre to .11 units. This implies an increase of 43,600 persons which is less than in the case of tea or rubber. It should be remembered that these figures relate to the long-term, i.e., to such period as when the entire area under tea, rubber and coconuts has been replanted and rehabilitated.

There is also considerable scope for increasing the productivity of existing areas cultivated with paddy and other peasant crops. Thus the "Agricultural Plan" postulates an increase in average yields of paddy from around 32 bushels per acre at present to 48 bushels over a five-year period. A long-term yield potential of 60-70 bushels per acre is also envisaged. It is difficult to assess the significance of this for employment in quantitative terms. Improving productivity in paddy cultivation involves the adoption of more intensive methods requiring greater labour time. But it is likely that there is already at present a considerable degree of under-employment in this field. If the population and workforce in rural areas remains static it may be reasonable to suppose that the main effect of an increase in productivity would be a reduction in under-employment rather than an expansion in the numbers required. However, in the context of a growing population in the rural areas the problem becomes less simple. When productivity and population increase at the same time it is possible to envisage a situation where the process of increasing output involves the "sharing out" of the additional work amongst larger numbers rather than a reduction in under-employment. In a particular sense this means an increase in the "absorptive capacity" of existing paddy lands. From an economic point of view of course this manner of absorption is quite unsatisfactory. Under-employment would remain and the rural areas would continue to sustain a surplus of population whose removal to other fields could only be beneficial. Nevertheless the possibility of a development of the kind described must be recognised. When assessing the future pressures on the employment market for actual jobs it would be misleading to neglect the "absorptive capacity" of the rural areas in the sense discussed here. The process of "work sharing", in the background of rising productivity, may make possible the sustenance of large numbers without a fall in living standards.

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[1] The estimates refer in the case of tea and rubber to estate averages. In the case of small-holdings the main impact of rehabilitation programmes will be towards reducing under-employment.

NEW LAND

In the sense of full time productive employment, however, the lands already under cultivation with paddy and other peasant crops are not likely to afford a significant outlet for the growing workforce. It is necessary to consider, therefore, the new areas that may be brought under cultivation in the future. What is the ultimate potential in this field. Although, as indicated in a later chapter, moderate extents of potentially cultivable new land are available in the wet zone it is in the dry zone that by far the greater proportion of such land is to be found. What is the extent of this land and what employment opportunities could it afford in the long-term ?

The cultivation of rice and many other crops in the dry zone requires irrigation. The total area of the dry zone comprises approximately 12 million acres. But of this extent, according to estimates made by the Irrigation Department, the gross irrigable area is 3,060,000 acres and the net irrigable area is only 1,530,000 acres. Roughly 562,000 acres of the latter is already under cultivation leaving a residual new extent of 965,000 acres. On the present water rate for paddy, it is estimated that 800,000 acres of this area in turn remain cultivable with this crop. The workforce that could be sustained on this land will naturally depend on the specific labour requirements for particular crops. On the basis of paddy, however, assuming the present allotment rate of 3 acres per family of 2 adults the aggregate absorptive capacity (in terms of direct employment) of the entire new area works out at approximately 645,000 persons.

The irrigable area constitutes, however, only a small proportion of the dry zone. What of the residue ? The answer would depend on the possibilities in respect of what is described as "dry farming"—involving the settled cultivation of lands not provided with irrigation. Clearly, if cultivation of this kind is possible the extent of useable land in the dry zone will be enhanced considerably. The numbers that could be provided with productive employment will be correspondingly increased and the entire picture of Ceylon's economic future altered.

The problems of dry farming have been the subject of research and experimentation in recent years. But several difficulties have been encountered and much work remains to be done. For instance, to quote a recent writer, "the problem of maintaining fertility, and even of keeping any soil in the holding at all, is so great that one cannot with confidence say that any device so far exploited can guarantee dry rotational cultivation of dry zone high land in perpetuity".[1] Here clearly is a field or research and investigation which is of tremendous import to Ceylon's economic future.

The Department of Agriculture has recently outlined a suggested pattern of land utilisation in the dry zone which includes within its compass both irrigated and non-irrigated land. It envisages a significant reduction in the extents to be provided with irrigation for paddy and the application of large acres to tree crops, pasture and highland dry crops. An estimated extent of 1.8 million acres is suggested for pasture alone. The Department is conducting further investigations into these possibilities and it is thus premature to comment on their feasibility. It is also difficult at the present stage to make a quantitative assessment of the opportunities for productive employment that a land use pattern of this nature would involve.

The picture that has emerged from the foregoing discussion on the ultimate absorptive capacity of agriculture may be summarised. If no allowance is to be made for dry farming and for extending cultivation in the wet zone there would remain the following broad totals for additional future employment.

Additional employment on existing plantation crops :—		
	Tea	392,000
	Rubber	117,000
	Coconut	43,000
Additional employment from rice cultivation on new land in the dry zone		645,000
	Total	1,197,000

The total of direct employment opportunities in agriculture in the long-term amounts to 1,197,000 persons. This compares with a projected increase in the workforce of 1,219,000 persons over the next 10 years alone.

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[1] B. H. Farmer—*Pioneer Peasant Colonisation in Ceylon*, Oxford University Press, p. 346.

There are several points which must be made about these figures. In the first place the figures themselves do not allow for any change in future technology which may result in altering the labour requirement for the crops specified or for future changes in the crops themselves. Secondly, they relate solely to what may be called permanent as against constructional or revolving employment. They do not, in other words, take account of the additional employment that may be created by the process of opening up new land or of replanting the areas under export crops. In the case of the latter, however, the additional employment is unlikely to be significant since labour already employed on current operations is likely to be deployed for replanting purposes. But there is clearly a large potential for employment in the opening up of new land in the dry zone. This involves the construction of irrigation works, roads, houses and a variety of other capital assets relating to the settlement of new populations. The extent of such employment would depend on the pace of construction. An increasing rate of development in this field is likely to lead to a continually expanding volume of employment. But, on the other hand, the process cannot proceed indefinitely at a rising rate. As the maximum physical potential of development is reached, constructional acitvity (in the field) will dwindle and lead to an actual reduction in the employment provided by it. The third point concerns additional employment in ancillary activities. The expansion in output of tea, rubber, coconuts, rice and dry zone agriculture will require a considerable expansion in activities connected with the transport, distribution, storage and, in several cases, the shipment of these commodities and the materials they require. Also involved will be the provision of services to the colonists in the newly populated areas. The provision of all these services will itself generate both constructional and permanent employment and so add to the productive outlets available for the future workforce. Quantitative estimates of this are, of course, extremely difficult to make, but it is important to recognise this aspect of the employment possibilities inherent in the maximum exploitation of the country's agricultural potential.

There are, however, on the other side of the picture, two points of basic importance. The estimates above ignore the period of time required to achieve them. Thus the estimates for the export crops relate to the situation after all lands under these crops have been replanted and are in bearing. Similarly, the estimates for the dry zone depict the position after the exploitation of the *whole* of the potential irrigable extent. Obviously the impact of these pressures on the employment situation would differ widely according to whether they would take, say, fifty years to accomplish or twenty. The actual rate of progress will depend on a number of factors which need not be elaborated here. But it is quite certain that neither of the tasks mentioned above are capable of being completed within a very short period such as five or even ten years. In the plans for the export crops analysed in a subsequent chapter the extent of replanting by 1968 would have covered only 14 per cent of the estate acreage under tea, 49 per cent of the acreage under rubber and 35 per cent of the acreage under coconuts. Physical factors particularly the availability of planting materials are a limitation. Similarly, the provision of irrigation to the full irrigable extent is likely to take time. On the average rate experienced in recent years an extent of only 200,000 acres would be developed over a ten-year period. It is desirable and possible to speed this up and indeed the plan presented later makes provision for this. But here again there would continue to be several factors which would restrain the pace of future expansion. Hence the extent to which agriculture could provide an outlet for the growing workforce over a specific period, say, for example ten years, would depend not merely on its ultimate potential but on the practicable rate of expansion over that period.

The second point is even more important. The assessments above relate to the ultimate potential in the field of agriculture. They apply to a situation where the possibilites of improving production and opening up new land have been within the bounds of known technology, fully exploited. The total land surface of the country is a fixed quantity. Once it has been fully exploited there would be no further scope for extensive cultivation. The limitations to a continued raising of yields are less rigid. Future technical and scientific developments are always likely to open up new possibilities. But here again the prospects are not, in the foreseeable future at any rate, likely to be indefinite. Once the whole of the areas under plantation crops have been replanted with high yielding strains and yields of rice and other similar crops have been raised to the highest practicable limits the scope for further expansion would appear less significant. A stage would then be reached when agriculture would no longer offer substantial opportunities for additional employment. Indeed future technical changes may tend towards an actual reduction in labour requirements.

The conclusion is clear. Whatever possibilities still remain in the field of agriculture it will not afford a permanent outlet for the growing population. Once these possibilities have been exploited to the full there will be no alternative but to develop other avenues of productive employment. In fact these other avenues will need to be developed even before that date. For even in the earlier phase, the rate of expansion in agricultural employment may well fall short of the rate of expansion of the total workforce.

VI. Industrialisation in the Pattern of Development

What other avenues of employment could be developed for the country's growing workforce ? The answer lies mainly in the field of industrialisation. The case for industrialisation is by no means based entirely on the employment factor. It could be justified on grounds of productivity alone. But industrialisation also offers a solution to the problem of a growing workforce because, unlike agriculture, its continued expansion is not dependent on a single factor of fixed quantity such as land. Industrial growth tends to be cumulative and, to a large degree, to feed upon itself. It is not limited, in Ceylon's conditions, by a general scarcity of labour although specific skills will need to be rapidly developed. Nor is it limited, in principle, by the absence of domestic raw materials, since materials can be procured from abroad. It generates, to a large extent, its own internal market and could also have recourse to supplementary markets abroad. A shortage of capital could affect the rate of industrialisation, but here again industry tends to generate its own surplus and is assisted by inflows from abroad. Given, therefore a cumulative process of industrialisation at an adequate rate it is possible to conceive of a solution to Ceylon's employment problem.

not true

INDUSTRIALISATION AND THE EMPLOYMENT STRUCTURE

In order to make a sufficient impact on the employment situation, in the background of a rising workforce, Ceylon will need to create a sizeable industrial sector. This would not mean, however, that the whole of the workforce that is surplus to agriculture would have to be employed in direct industrial activities. Even in the highly industrialised countries the proportion of the total workforce directly employed in manufacture is not as large as is sometimes believed. Industry, like agriculture, sustains a number of ancillary activities, such as transportation, trade, distribution, and so on which together provide substantial employment outlets.

Comparative figures of the relative contributions made by agriculture and industry to employment and output in selected countries are shown below. They illustrate the impact of industrialisation on the employment structure.

TABLE VI

The Structure of Employment — An International Comparison

	Agriculture, Forestry and Fishing		*Manufactures and Mining*		*Others.*	
	Employment Per Cent.	*Gross Domestic Product Per Cent.*	*Employment Per Cent.*	*Gross Domestic Product Per Cent.*	*Employment Per Cent.*	*Gross Domestic Product Per Cent.*
Thailand (1947)	85·8	60·3	2·3	12·8	11·9	26·9
Pakistan (1951)*	79·4	60·7	6·7	7·0	13·9	32·3
India (1951)*	70·6	50·7	9·5†	16·9†	19·9	32·4
Ceylon (1957)	57·1	54·4	8·6	7·6	34·3	38·0
Japan (1956)*	41·2	18·5	19·2	28·3	39·6	53·2
U. S. A. (1950)	12·2	6·4	28·5	30·4	59·3	63·3
U. K. (1951)	4·9	5·7	41·2	43·0	53·8	51·2

* Figures are for net domestic output.

† Includes construction.

Sources :

Economic Bulletin for Asia and the Far East Vol. IX, No. 3, 1958. Economic Development and Planning in Asia and the Far East (pp. 8–9.)

In some cases Gross Domestic Product data relate to different years from those given her for employment.

Statistical Year Book (*UN*) 1956.

For Ceylon : Planning Secretariat.

The extent of industrialisation in Ceylon is somewhat understated in the figures above since employment and production in tea and rubber factories are included in the category of agriculture. Conceptually these activities belong to the industrial group. Their inclusion in that group will admittedly present a truer picture of the extent of industrial activity which already prevails.

Nevertheless, the bulk of Ceylon's working population is today engaged in agriculture, rather than in industry. One of the major goals of planning would be to bring about a progressive change in this structure with industry playing an increasing role in respect of its contribution to both employment and national output. This will involve a considerable stepping up of the pace of industrial development. For instance, if the proportion of Ceylon's total workforce which is engaged in industry is to increase beyond the present percentage a stage will have to be reached when, at a lower limit, more than 8.3 per cent of the annual increase in the workforce will have to be applied to industry. This involves a minimum average annual absorption of more than 10,400 persons into this field.

THE PRODUCTIVITY BASIS FOR INDUSTRIALISATION

How can a process of industrialisation be set in motion in Ceylon? In a purely agricultural country with low income levels and with little or no trade with the outside world an improvement in agricultural productivity is often an essential condition for successful industrial growth. Low levels of agricultural productivity inhibit industrial development since they imply on the one hand low real incomes and a lack of demand for manufactured goods and on the other the devoting of virtually the whole workforce to the production of bare subsistence needs. An improvement in agricultural productivity is thus needed in order to provide both the markets and the labour for an initial process of industrial growth. Once industrial growth commences it contributes towards its own expansion and also assists further improvements in agricultural productivity.

The argument above, however, is not entirely applicable to Ceylon. It is true that in Ceylon the bulk of the population is still engaged in peasant farming at relatively low levels of productivity. But there already exists other sectors of the economy where productivity is high. This is particularly true of the plantations and the activities connected with them. Income levels are not so low in Ceylon as to afford a negligible demand for industrial products either for consumption or for investment. In other words the initial productivity basis for industrialisation has already been created and a market for manufactures already exists. Although further increases in agricultural productivity will strengthen these markets and assist industrialisation in other ways as well, such increases are not an essential condition for the commencement of a process of industrial growth. Similarly, population growth has already created a surplus population in agriculture whose initial absorption into industry does not require a radical change in productivity.

The availability of a pre-existing market for industrial products (and of labour) affords a point of commencement in planning for industrial development. In 1957 industrial products of an approximate total value of Rs. 1,543 million were used in Ceylon for purposes of consumption or investment. Local production, however, accounted for only Rs. 380 million or 15 per cent of this amount. The remaining 85 per cent amounting to Rs. 1,163 million in value was supplied through imports from abroad. To put this in another way, though the productivity basis for the initial establishment of a market for manufactures has already been established through the development of plantations and other sectors of the economy, this market has hitherto been satisfied largely through imports. A process of import substitution, could therefore afford a basis for industrial development through the production locally of manufactured goods that were hitherto imported.

It is not suggested here that the domestic market must provide the sole basis for industrial growth. There is also the possibility for industrial production for export: such production could embrace not merely the further processing of existing agricultural products but also new products based on the processing of imported materials. Moreover, in principle it is easier to commence industrialisation on the basis of a domestic market since in this case conscious policies could play a more effective role in mitigating difficulties.

THE CRITERION OF SCALE

It would not be realistic, of course, to attempt the local production of all imported manufactures. There are a host of considerations specific to each industry which would exercise a determining influence in respect of their feasibility locally. As a first approach in industrial planning, however, there is a rough criterion that may be applied. In terms of modern technology there is, usually, for each industry or type of manufacture a minimum technical scale of production consistent with efficiency. Where the available domestic market is large enough to absorb the output of an efficient plant there is, other things being favourable, at least a prima facie case for the establishment of such a plant. Such a criterion cannot, of course, be a hard and fast one. Where there is a possibility of export, for instance, the inadequacy of domestic market need not be a handicap to starting production in Ceylon. Again the need to import raw materials may in some cases have so unfavourable an effect on costs as to negative the usefulness of local production.

There is a further point. Within the category of industries that are suitable on grounds of scale some are likely to be more desirable than others. The contribution made to national income and to further reinvestment would differ from industry to industry. Planning must, in the context of limited resources, pursue some order of preference in the choice of industries to be actually established. Subject to these reservations it is useful as an initial step to consider industrial development in Ceylon in terms of the size of the domestic market. Such an approach is in a sense a natural one for a small country in pursuit of industrial development. The alternative and more common approach, in terms of the local availability of agricultural and mineral raw materials is likely to prove unduly restrictive in such a country.

THE DOMESTIC MARKET

The industrial products used or needed in Ceylon for purposes of consumption or investment are shown in the table below, which indicates present imports as well as future requirements ten years from now. These forecasts are made in terms of a range of values.

TABLE VII

Requirements of Industrial Products (1957 & 1968)

(Rs. Million)

(*Rs.* '000)	1957 (*Retained Imports*)	1968 (*Estimated Requirements*)	
		Low	*High*
Fertilisers	70·2	96·9	200·0
Chemicals	20·4	28·2	36·8
Petroleum products	128·4	177·2	224·7
Textiles and clothing	190·3	262·6	304·5
Paper	36·8	50·7	65·1
Cement	27·7	38·3	79·0
Iron and steel products	83·9	115·8	213·9
Vehicles and Transport equipment	110·0	153·2	227·6
Machinery—Electric	48·9	67·5	113·4
Miscellaneous NES	274·3	377·0	497·4
Total	990·9	1,367·4	1,962·4

Note.—The low projection is based on the index equivalent to the index population growth i.e., 1·38 by 1968.

The high projections are based on the following indices for 1968 :—

Investment goods and Fertilisers	2·85
Intermediate goods	1·80
Consumption goods	1·60

As the figures shown here indicate, there is considerable scope for industrial expansion in Ceylon on the basis of the domestic market alone. The total gross value of industrial requirements amount to Rs. 991 million and would rise to between Rs. 1,367 million and Rs. 1,962 million by 1968. There are, however, some qualifications that must be made. In the first place, it would be wrong to suppose that in Ceylon's conditions all existing imports of manufactured goods could be produced locally. As already mentioned, for reasons of scale and on other grounds as well, there would be a range of products whose local manufacture would not be feasible. In the second place, even in the case of items that could be produced locally, the contribution which such production would make to national income will often fall short of the total value of these items. The reason is that local production may require the importation of raw materials. In these cases the 'net value added' through local production would represent only the difference between the total value of output and the outlays abroad on imported materials and other requirements. The total contribution which import substitution, on the basis of the present market, would make to national income should not therefore be exaggerated.

On the other hand, import substitution in the field of industry is not a once and for all process. As already mentioned, general economic expansion and industrial growth itself will generate further demands for industrial products. These may either be imported or produced at home. In fact there could, as a general principle, be a successive process of import substitution. The replacement of existing imports would free foreign exchange for the importing of new products which could in turn be manufactured locally. Nevertheless, the possibilities on this score should not be overstated. As industrialisation proceeds and available domestic raw materials resources are exploited to the fullest, Ceylon would have to depend on the importation of materials and other requirements from abroad which by their nature cannot be substituted for locally. Such demands may make increasing claims on the country's foreign exchange resources and unless the latter are to increase a progressive narrowing down in the scope for continued import substitution may result.

THE EXPORT MARKET

The conclusion that emerges is important. Industrialisation is the solution to the problem of Ceylon's increasing workforce and the country's economic growth in general. The stage is already set for initiating a process of industrialisation on the basis of import substitution. But it is doubtful that import substitution alone will make possible the magnitude of industrialisation needed to provide employment for the increasing workforce. In the long run industrial production for export may also be necessary. On the basis of export markets it should be possible for a country like Ceylon to sustain a very large proportion of the total workforce in this field. This indeed has been the pattern of development in many other small countries which have successfully established a substantial industrial sector.

There are, of course, a number of problems connected with the establishing of industries for export. For instance, there would be the problem of cost and of competitiveness in foreign markets. In the initial stages in particular, before widespread industrial technology and cost reducing overheads have been developed, Ceylon's competitive position may not be strong in the field of industries dependent on imported raw materials. Lines of activity based on domestic materials may offer more promising avenues for the initial development of exports. But even in the case of the former opportunities for export need not be absent altogether. In certain instances production for the domestic market may provide the basis for entry into export markets (e.g., fertilizers). In such cases local protective policies may enable producers to supply foreign markets at competitive prices. Again, in the case of markets of close geographical proximity where industrial development is handicapped by institutional and other factors supplies from Ceylon may be more economic than from more distant industrial centres. For all these reasons, problems of cost and competitiveness need not be insuperable.

There are, however, other problems as well. Most of Ceylon's potential export markets are likely to be in the Asian region. Virtually, all the countries of this area would themselves be pursuing the objective of industrialisation and would consequently be setting up protective tariff barriers. Such barriers may in effect constitute the most serious obstacle to industrial exports from Ceylon. There are two approaches to the solution of this difficulty. These are not alternatives and may both be pursued. The first approach is for Ceylon to develop those types of product whose exports are not likely to encounter tariff barriers. Capital and intermediate goods obviously fall into this field. Developing countries in the region are likely to be in urgent need of such goods and it is unlikely that local production will easily catch up with such requirements. The items in this category are not confined to heavy machinery and products of similar complexity. Mechanical components of various kinds, cement and other constructional materials, as well as fertilisers provide examples of potentially exportable capital and intermediate goods. Many of these are not likely to encounter significant tariff barriers abroad.

The second approach is through co-ordinated regional planning between the countries of the area. This should provide for a certain degree of specialisation and interdependence in industrial development. Obviously, the industrial markets available to countries of the region, particularly the smaller ones, would be much larger if instead of autarchic policies there was a degree of complementary and co-ordinated planning based on mutual trade. In view of the complexity of the problem it would not admittedly be realistic to expect co-ordination of a detailed and extensive type to evolve over a very short period. But this is certainly a field in which a useful beginning can now be made and Ceylon has already taken the initiative to sponser a regional meeting for discussing the relevant issues. The advantages to Ceylon of such an approach would be more marked as the process of industrialisation advances in this country and the prospect of manufacturing for export becomes a reality.

INDUSTRIAL PLANNING AND POLICY

Once the process of industrial development gathers momentum and the scale of such development is enhanced by entry into export markets

5—J. N. R 2359 (6/59.)

Ceylon will bring about a basic transformation in her employment structure and in the sources of national income. In the preliminary phase, and certainly over the next 10 years, the main spurt in industrial development can best be obtained through production for the domestic market by import substitution. Such a result requires a deliberate programme or plan for the establishment and expansion of specific industries.

The plan for industrial development, as presented in Chapter 8, comprises two parts. The first contains relatively specific projects which are amenable to detailed programming. They relate mostly to plants of a larger type many of which would be undertaken by the public sector. The second part comprises manufacturing activities of a varied nature which may be expected to develop over the period under the stimulus of well conceived policies of encouragement. It is hardly possible or even necessary to specify these activities in an overall plan for industry. To do so would be to introduce rigidities into the field of industrial development. Broad projections of possible investment, employment and output totals could, however, be made. These serve the purpose of providing an overall picture.

An effective programme for industrial development must cover, in addition to specific projects and investment totals, a number of ancillary measures and policies. These would include the establishment of suitable agencies and forms of organisation for public sector enterprises, facilities for the training and supply of labour and skills, provision for research and improvements in technology, agencies for the supply of capital and credit, policies for marketing and protection, policies for the acquisition of skills and capital from abroad, incentive schemes in taxation, and so on. These requirements are discussed in the relevant chapter. There is, however, one point on which it is appropriate to comment at the present stage. This relates to the role of protection in industrial development.

Despite the desirability of import substitution it is hardly likely that Ceylon, lacking as it does so many of the overheads of a developed industrial economy could find more than a very limited range of items whose local production would be cheaper than imports. A programme of development confined to only these items cannot be particularly large. If Ceylon is to pursue industrialisation on a substantial scale there would appear to be no alternative but to initiate a serious and effective policy of protection. Such a policy would have to go beyond that envisaged in the familiar ' infant industry ' argument. Protection in Ceylon may be needed for a longer period than is required for only the initial commencement of particular ventures. It may in fact need to be sustained over the whole period during which an effective ' infra structure ' for an industrial economy is built up. In the field of industry, in contrast to agriculture, favourable comparative costs are more the result of such a structure than of advantages in geographical position. They are based in effect on a well developed network of technology and skills, of power supplies and transport systems, of efficient business and commercial practices and a host of other factors. Until these have evolved, efficiency and hence costs in industrial production would tend to fall behind that of advanced countries. Unless, therefore, local industries have the shelter of a protective policy industrialisation may not make an effective beginning.

There are, of course, several dangers and drawbacks inherent in a widespread policy of protection. In the first place it is important that protection be afforded with discrimination and that its extent is not excessive. Whilst too low a degree of protection will defeat its purpose an excessive amount will lead to windfall profits and remove the incentive to greater efficiency. Both the method of and the degree of protection have to be carefully worked out. It is therefore important that suitable machinery, such as a specialised and well staffed tariff commission or industrial protection board, be set up so as to avoid ad hoc and unscientific measures. Secondly, a policy of protection may lead to a raising of consumer prices and to a loss of revenue to government. Both these consequences can be serious. In the case of rising prices it may be necessary in certain exceptional fields, covering bare necessities for instance, to introduce a system of offsetting subsidies. But such a policy cannot obviously be an extensive one. A raising of prices over the period of development is one aspect of the burden the country must bear. Similarly, if Ceylon is to develop its industries the Government cannot expect custom duties on imported manufactures to continue as the major source of revenue. Although protection involves a raising of duties it is likely to diminish revenue since the volume of imports may fall. It would nevertheless be shortsighted to refuse protection on the grounds of a fall in revenue from import duties. On a dynamic view, industrial development can only strengthen the financial position of the Government through cumulative accruals from income, profits and other taxes. But in the short run a fall in customs duties is part of the price that has to be paid for industrialisation.

VII. The Supply of Capital Goods—the link between industrial and agricultural development

It remains now to discuss the question of capital goods needed for the setting up of industries.

LARGE AND SMALL COUNTRIES

If a country was embarking upon a self-contained process of industrial development with little or no trade with the outside world it would clearly need to manufacture within its own boundaries the capital goods it requires. Since the rate of expansion of the country's capacity depends on the availability of capital goods the creation and expansion of a capital goods sector becomes the first priority in industrialisation. This involves large investments in iron and steel, heavy chemicals, machine building and so on rather than in light consumer goods industries or even agriculture. It is easy to see, however, that such a process would only be feasible in large continental countries which possess within their own boundaries the variety and quantity of natural resources needed for these industries. These countries would also have the outlets for these industries in magnitudes sufficient to satisfy the requirements of scale. The industrial development of such large countries as the U. S. A., Soviet Union, China and India have thus proceeded on the basis of a large capital goods and heavy industries sector.

For small countries, however, a pattern of this nature would not be feasible. Whilst these countries would probably be able to produce some capital goods they are unlikely to possess either the raw materials or the outlets needed for the local production of the entire range of these goods. Attempts at self-contained development are likely, therefore, to be thwarted at a relatively early stage. Nevertheless, there is a factor which enables such small countries to overcome these difficulties and proceed towards industrialisation. The factor is foreign trade. Small countries need not themselves produce the machinery and other capital goods needed for setting up industries if they are able to import these from abroad. Apart from foreign aid or borrowing the means for procuring these imports would have nevertheless to be found. This requires in turn the availability of export products. If such countries are in possession of export products or are able to develop them they would have open a path towards industrial growth.

THE UTILIZATION OF FOREIGN EXCHANGE RECEIPTS

Ceylon is fortunate in that it already produces export products of a sizeable value. Exports of tea, rubber and coconut for nearly 35 to 40 per cent. of its national income. This means in effect that the country earns an amount equivalent to 35 to 40 per cent. of its national income in foreign exchange. If even a substantial part of these foreign exchange resources can be devoted to the purchase of the capital goods needed Ceylon can envisage a rapid rate of development.

The way in which Ceylon's receipts of foreign exchange have been utilised in recent years is shown in the table below :

Imports (excluding re-exports) into Ceylon, 1940-1956

(at current prices)

	Total imports *Rs. Million*	*Per Cent.*	*Imports of consumption goods* *Rs. Million*	*Per Cent.*	*Imports of Capital and Intermediate goods* *Rs. Million*	*Per Cent.*
1946	651·4	100	521·0	80·0	130·4	20·0
1947	911·9	100	726·9	79·7	185·0	20·3
1948	922·9	100	716·3	77·6	206·5	22·3
1949	974·1	100	736·6	75·6	237·5	24·4
1950	1,102·2	100	855·6	77·6	246·6	22·4
1951	1,480·9	100	1,082·9	73·1	398·0	26·8
1952	1,612·0	100	1,172·1	72·7	439·8	27·3
1953	1,529·8	100	1,122·5	73·4	407·3	26·6
1954	1,307·2	100	945·9	72·4	361·3	27·6
1955	1,391·7	100	977·4	70·2	413·6	29·8
1956	1,545·5	100	1,093·3	70·6	454·2	29·4

Source : ***Studies in the Import Structure of Ceylon*** by Peter Newman 1958. Planning Secretariat page 20, Table 8.

Note.—Intermediate goods comprises largely raw materials.

There are two main points that are brought out in these figures. First, that by far the major part of Ceylon's foreign exchange receipts are utilised for the purchase of consumer rather than of capital goods, and second that there is evidence of a gradual shift in this pattern over recent years in favour of capital and intermediate goods.

The predominance of consumer goods in the import structure reflects the nature of Ceylon's export economy as it has developed historically. Economic development in the past in this country has been associated with the emergence of agricultural export crops rather than with production of domestic foodstuffs or of manufactures. These export products were exchanged in world markets for the country's consumer needs—particularly rice and other foodstuffs and textiles. The export sector in Ceylon has evolved into the equivalent of a consumer goods sector. One of the main objectives of future planning and development is to change this situation. It is, in brief, to convert the export sector into being the equivalent, not of a consumer goods sector as at present, but a capital goods sector. There is, as mentioned, already some evidence of a gradual trend in this direction. The task for the future is to carry further this process and to step up the rate of change as fast as possible.

How can Ceylon's export sector be transformed into the equivalent of capital goods sector ? There are broadly three possible avenues. The first could be a reduction in the absolute volume of consumption in Ceylon which will take the form of an outright reduction in imports of consumer goods. The foreign exchange resources freed through this means could then be applied to the purchase of capital goods. The second avenue is to increase export earnings beyond present levels and to utilise this increase, or as much of it as possible, for the importation of capital goods. The third avenue is to replace consumer goods imports by the local production of these goods. The foreign exchange savings on these imports would then be available for the purchase of capital goods from abroad.

Whilst there is, in Ceylon, some scope for pursuing each of these avenues it is essentially in respect of the second and third approach that the potentialities are largest. There is undoubtedly a margin by which savings in both the public and the private sectors could be increased (or consumption reduced) within present levels of income. It would be sound policy to pursue to the full the possibilities on this score. This would involve the application of appropriate fiscal and other polices which restrain consumption and stimulate savings. But, in the context of a relatively poor country with a rapidly growing population, these possibilities are obviously limited.

It is necessary therefore, to turn to the two other avenues. These involve ever increasing exports and saving consumer imports. It is important to appraise the possibilities in respect of each. In terms of planning and development both these courses involve an increase in the output of export products and of import substitutes and it is these aspects which are mainly considered here. It is nevertheless important to realise at the outset, that there is another means whereby savings from exports can rise and outlays on consumer imports fall. This source is often neglected in exercises in planning because of inherent difficulties in handling it. But it can, all the same, be of extreme importance in the conditions of Ceylon. This is a favourable change in the terms of trade.

The process of increasing output whether of export products or of import substitutes generally involves heavy costs and vigorous efforts. But equivalent or even more far reaching results in terms of foreign exchange earnings may also be realised more quickly and simply through changes in external prices. Thus, in 1957, for example, whilst export output was 16 per cent. higher than in 1948 export prices were 42 per cent. higher. On account of different distributional consequences it is easier to mobilise for investment through taxation and saving a portion of an increase in export value due to price changes than to output changes. This is particularly true where an increase in output involves higher employment and a rise in the wages bill. It is important therefore that Ceylon's fiscal system be so adapted as to channelise into investment as large a part as possible of any favourable movement in the terms of trade—particularly of export prices. This could be necessary whether these movements are cyclical in nature or of a long-term character. The changes in the terms of trade may, of course, be downward. Such a movement could offset or negative any gains through an increase in output. It would in consequence react adversely on the process of increasing the rate of investment and of devoting foreign exchange resources to the purchase of capital goods. Here again it is necessary that sufficient flexibility be maintained in planning so as to meet this situation. In a country so dependent on external trade it is important to realise that although many of the objectives of planning are pursued in the field of production they can yet be deeply affected by changes in the external situation.

THE LINK BETWEEN INDUSTRY AND AGRICULTURE

The possibilities of increasing exports and saving imports may now be examined subject to the reservations above. As will be seen presently agricultural development is not a separate goal that is independent of the country's industrial objective. On the contrary the success of the industrialisation programme will depend very closely on the achievement of effective results in the field of agriculture. The plans for industry and for agriculture thus become closely inter-related.

Agricultural development can contribute a great deal towards each of the objectives of increasing exports and of saving imports. The reason for this is simply that Ceylon's existing exports are almost entirely agricultural products and that agricultural products also comprise a considerable proportion of Ceylon's imports which are capable of being produced locally.

Reference has already been made in a previous section to the considerable scope that exists for increasing the output of tea, rubber and coconuts. The table below summaries in quantitative terms the estimated long-term output potential in these industries.

TABLE IX

Long-term Output Potential of Export Crops

	Present yield per acre lb.	*Estimated future yield lb.*	*Total present output Million lb.*	*Total future output on present acreage M. lb.*	*Value of present output Rs. M.*	*Value of future output at present prices Rs. M.*	*Increase in output lb. M.*	*Increase in value Rs. M*
	1	2	3	4	5	6	7	8
Tea	697	1475	398	811	1106	2,225	413	1,149
Rubber	333	1012	220	588	315	841	368	526
Coconuts*	1951	3000	2090	3213	357	546	1123	189

* The unit for coconuts is nuts or million nuts respectively.

The yield increases depicted above can be realised through vigorous programmes of replanting and rehabilitation. The percentage increase in output shown above amount to 104 per cent. for tea, 167 per cent. for rubber and 54 per cent. for coconut. Provided prices do not change such increases could contribute greatly towards increasing the rate of growth in the Ceylon economy. Not many countries it would seem, are in the fortunate position of being able to double the output of a sector of the economy which produces 35 to 40 per cent. of the national income in foreign exchange. In Part II a specific programme for these products is outlined covering a ten-year period. The estimated increase in output over the next ten years would of course be less than the long-term potential. Apart from tea, rubber and coconuts there are possibilities for export in other fields covering not merely agricultural but also mineral products and industries. The subject of industrial exports has already been discussed. In addition there is scope for enhancing the value of existing exports through further processing. With growing industrial development the scope for increasing exports could be continuous rather than of a once and for all kind.

The application of additional export earnings of foreign exchange to the purchase of capital goods requires that these earnings be not spent on increasing imports of consumer goods. This involves two things. First, that a large part of the increase in incomes resulting from the additional output is saved ; and second, that as large a part as possible of any increase in consumption is satisfied through an increase in the local production of consumer goods. But here again it is necessary that income earners producing these goods locally do not spend the whole of their additional income on consumption. The importance of the savings component in any increase in incomes is once again emphasised.

Similarly, on the side of saving imports a vigorous programme of import substitution in the field of both industry and agriculture is possible. The scope for import substitution in industrial products has already been discussed. But a substantial proportion of Ceylon's imports, roughly 42 per cent., is made up of agricultural goods, milk and meat products and fish products. The major items in this category are shown below.

TABLE X

Present Imports and Future Requirements of Agricultural Products

(Rs. million)

	1957	1968	
		Low	*High*
Meat and meat preparations	5·5	7·6	·8
Dairy products, eggs and honey	62·9	86·7	1080·6
Fish and fish preparations	80·1	110·5	128·2
Rice and other cereals	346·4	478·0	554·4
Fruit and vegetables	84·3	116·4	134·9
Sugar and sugar preparations	84·1	116·1	134·6
Coffee, tea, cocoa, spices beverages &c.	45·6	63·0	73·1
Tobacco and tobacco manufactures	18·9	26·1	30·2
	727·8	1,004·4	1,164·8

Notes : (1) This Table differs from the other tables of total agricultural poducts in Chapter 2 as it includes processed agricultural products. In that chapter processed products have been transferred to the industrial sector.

(2) High and Low projections as previously indicated at p. 31 above.

A glance at the items shown above suggests that virtually all these are capable of being produced or substituted for locally. Production programmes must, however, aim at satisfying both present and future needs as well. Broad estimates of these needs over the next 10 years are therefore indicated in the table above. In Part II actual programmes drawn up on the basis of such needs are presented. In each case the realisation of these goals calls for the most vigorous efforts in development. They involve the raising of yields, the opening up of new lands and the introduction of new crops. The success of the agricultural plan is of vital importance to the entire policy of industrialisation. If agricultural output does not increase, the growing needs of the future population will have to be satisfied through additional imports. This would mean that the country's foreign exchange earnings will not be available for the importation of capital goods. Instead of rising, the share of capital goods in the import structure may even fall. Such a result will slow down the rate of development and frustrate the entire strategy of development in Ceylon.

The savings in foreign exchange through import substitution in the field of agriculture, animal husbandry and fisheries will, of course, fall short of the full value of the additional output in these fields. It is true that imports of raw materials requirements are likely to be less in agriculture than in industry. But additional agricultural output implies additional incomes to producers which in turn involve additional consumption. A part of these consumer requirements will probably have to be met out of imports. The net reductions in foreign exchange outlays would, therefore, tend to be less than the gross reductions or the full value of the new output. The extent of these net reductions would depend again on the amount of savings that could be realised out of the additional incomes. The greater the savings, the greater the contribution which import substitution would make towards the rate of investment and the importation of capital goods. It must be realised that forms of organisation and techniques of production which involve low labour productivity are not conducive towards producing greater savings. Since such forms are more common in agriculture than in industry this is a problem which planning for agriculture will have to face. The pursuit of low productivity methods even though it may involve in many cases the employment of larger numbers, will only serve to reduce the contribution which agricultural development will make to the rate of expansion in the economy as a whole.

The discussion above has served to outline the main principles of what may be called a strategy of development for Ceylon. It may briefly be summarised. The objective of progressive industrialisation forms the cornerstone of this strategy. Industrialisation need not however depend on the prior establishment of a capital goods sector in this country centering on heavy industries of various kinds. The capital goods and machinery required for industrialisation, and for other purposes may be obtained from abroad through imports. This involves the application of foreign exchange resources to capital imports rather than to consumer imports. Apart from absolute reductions in consumption, developments in agriculture can provide the most potent means of achieving this end. These developments in turn involve increasing the output of export crops on the one hand and on the other, the domestic production of agricultural goods to replace imports. This process would be further strengthened by the growth of industry itself through the replacement of industrial imports. As a corollary to the increase in domestic output and incomes, whether in industry or in agriculture there must be an increase in savings. This involves not merely fiscal measures to promote savings but forms of organisation and techniques of production where productivity and the surplus for reinvestment are highest.

A strategy of development which aims at a progressive expansion in the volume of capital imports does not imply that Ceylon should desist from the production of capital or intermediate goods of any sort. On the contrary, where the criterion of the requirements of scale and other conditions are satisfied there would exist the possibility of producing these goods locally. These possibilities should clearly be pursued. On the basis of the figures quoted earlier, for instance, there would appear to be scope for the local production of such products as fertilisers, cement, refined oil and possibly iron and steel products including machinery and equipment for agriculture. There are, in particular, two items which belong to the category of intermediate or capital goods whose supply locally is absolutely essential for the success of any accelerated drive for economic growth. These items are power and constructional materials.

THE SIGNIFICANCE OF POWER SUPPLIES AND CONSTRUCTIONAL MATERIALS

The strategic role which power and constructional materials play in regard to development in general and to industrialisation in particular was emphasised in a previous report.[1] An outline programme for the development of power was also included there. Developments since the publication of that report have served to underline two points. The first is that, given a vigorous programme of industrialisation such as is envisaged in the present report future requirements may well turn out to be even higher than depicted earlier. The second point concerns nuclear power. The rapid technical developments in this field together with the urgency of obtaining power supplies in Ceylon suggest that the introduction of nuclear power may take place before the period envisaged in the Interim Report. The latter report contemplates the development of Ceylon's hydro-electric power potential to the full through the construction of successive power projects. Nuclear power was generally considered in terms of supplementing the country's hydro-electric potential. With the fall in costs of nuclear plants however, through continued technical developments in this field, it is possible that nuclear power would prove to be a more economic alternative to hydro-power. In such a situation the question of the further construction of hydro-power projects will be raised. However, technical changes in the field of nuclear energy are still evolving and it is unlikely that decisions to proceed with the construction of the major hydro-projects over the next 10 years need to be altered. These and several related issues are discussed in the chapter in Power in Part II of this report. However the general picture is clear. An expanded programme of power development must form an integral part of any development plan for Ceylon. Investments for this purpose would, in consequence, take up a fair part of the total of resources made available for an overall plan.

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[1] *First Interim Report* of the National Planning Council.

Similarly, an expanded programme of development is certain to make enormous claims on constructional materials of all kinds—particularly cement, bricks, and tiles, and timber. These materials will be required for works of capital construction whether these works are in the field of industry, agriculture, irrigation, power development, transport, ports, education, health, or housing. If the output of these materials is not forthcoming in the required quantities the entire development plan will be jeopardised. It is, in other words, not sufficient to make a selection of projects in various fields, to provide the monies required for them, and to assume that the physical materials and resources needed would flow automaticaliy. Unless conscious efforts are made to provide for them scarcities could very well develop which will result in both an inflationary rising in project costs and a retarding of construction schedules. Constructional materials are clearly a category of capital goods whose production can and must be undertaken locally at an accelerated pace. Consequently cement plants as well as brick and tile production units must be established and expanded rapidly under techniques of production which are highly productive and efficient. Indeed a capital goods sector centering around the constructional materials industries should form an important part of the industrial structure of Ceylon. Programmes for the production of cement, not merely for the replacement of present imports but also for meeting future requirements are outlined in Part II. Similar programmes are also envisaged for bricks and tiles.

VIII. Expansion in Other Fields

The general strategy of future development set out in this chapter has so far been in terms of the expansion of industrial and agricultural output. The specific ways in which industrial and agricultural development are inter-related in the conditions of Ceylon have been indicated. Programmes of expansion of an adequate scale for each of these fields must form the central core of any effective plan of development. But they would not by any means comprise the whole of such a plan. There is also the need for programmes in a number of other fields as well—particularly transport and communications and the social services.

TRANSPORT

The programmes for industrial and agricultural expansion provide the initial basis for making assessments of needs in respect of transport, communications and even to some extent of the social services. For instance, the programmes for the export crops and for import replacement in agriculture and industry give an indication of the magnitude and composition of the future traffic in Ceylon's ports. Similarly, these programmes would serve to provide an indication of future requirements in respect of roads and railways. In Part II of this report outline programmes are presented in the field of transport covering ports and harbours, roads, railways and civil aviation. To such extent as is possible at the present stage, these programmes have attempted to anticipate the pressures that development in other fields would impose on the transport system. However, for the most part, the programmes presented here are of a somewhat lesser degree of completeness than say the programmes for tea, rubber, coconut, fisheries, or even industry and power. A closer analysis and elaboration of these programmes is one of the important tasks that lie ahead.

SOCIAL SERVICES

EDUCATION

The application of more specific planning techniques is of equal importance in the field of the social services—particularly education, health and housing. Ceylon's standards of advancement in this field compares well with other Asian or low income countries. Although there is possibly some conflict in the short run between investment in this sphere and in directly productive undertakings, the long-term effects on development of high standards in education, health and housing are nothing but favourable. In